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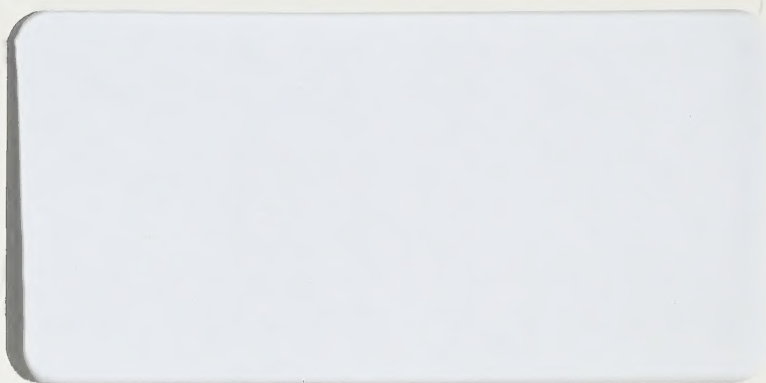CONSUMPTION, INCOME AND RETIREMENT

by

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ABSTRACT

We use unpublished Canadian Family Expenditure Survey data on individuals for the years 1969 to 1982 to estimate consumption and income age-profiles for married-couple families, paying attention to the transition between work and retirement. The common presumptions of numerical-simulation life-cycle models - upward-sloping consumption-age profiles and dissaving in retirement - are not supported. There is some evidence that the consumption of certain (blue-collar) households declines discontinuously near retirement, which casts doubt upon the frequently-encountered assumption that the marginal utility of consumption is independent of the quantity of leisure consumed. In addition, the paper shows that the uncertain lifetime model can rationalize the empirical results and may therefore be a more suitable vehicle for policy simulations.

Preface

Those interested in the behaviour of individuals and
families over the life cycle ideally would like to have
continuous observations on the consumption, labour supply and
other choices of household members over their entire lifetimes.
Panel data of this sort are rare. In Canada, the best microdata
sources for this kind of information are the Family Expenditure
Surveys which are conducted regularly by Statistics Canada,
primarily to update the "representative basket of commodities"
used in constructing the Consumer Price Index. These surveys
collect information on educational, occupational and other
characteristics of the household head, the spouse if present,
and other household members, as well as detailed information on
household expenditures.

By matching samples from different surveys for cohorts
defined by age and other household characteristics one can
construct "pseudo-panel" data that may be a reasonable
substitute for real panel data. This sort of data set has been
assembled from U.K. Family Expenditures data and has been
productively employed by many researchers (see Browning, Deaton
and Irish (1985), for example). It is their approach that we
follow in this paper.

Family Expenditures Surveys after 1976 have been conducted
under the new Statistics Act, which permits Statistics Canada to
release public use sample tapes. To date, PUSTs exist for Family
Expenditures in the calendar years 1978, 1982 and 1984. Legal

restrictions prevent Statistics Canada from releasing PUSTs for earlier surveys. In the Fall of 1985 we began to explore the possibility of gaining access to Famex data from earlier surveys with Michael Wolfson of the Social and Economic Studies Division of Statistics Canada. In the spring of 1986, Martin Browning and we started to develop and to carry out preliminary research on the 1969, 1972, 1974, 1976, 1978 and 1982 Famex internal working files.

In 1985, Ms. Louise Heslop undertook an energy study using age cohorts constructed from the 1969 through 1978 Famex Surveys. She was assisted in her research by Mr. Brian Murphy who also helped us in the initial stages. Subsequently, Mr. Harry Champion and Mr. Ulysses Nevraumont have provided much needed interpretations of the raw data and, in addition, Mr. Grant Cameron of the Social and Economic Studies Division has proven to be a most able research assistant as has Maria Berruti of McMaster University. We are immensely grateful to everyone who has helped us in this research.

Before turning to our research report proper we should explain   the status of the data.   As we noted above, the microdata for surveys prior to 1978 cannot be released to the public. We understand, however, that the Social and Economic Studies Division is quite prepared to permit anyone to use these data within Statistics Canada either to replicate our work or to conduct new research, as long as the Division and Statistics Canada are reimbursed for any expenses incurred.

1.   Introduction

The life cycle model has become the standard one for
thinking about many policy questions. Arguments for the
superiority of consumption over other forms of taxation are
typically grounded in simulations based on the life-cycle growth
(or overlapping-generations) model. Analyses of the relative
merits of different exchange rate regimes, the role of money in
a competitive economy, and government debt policy are additional
examples where policy advice is critically dependent on some
version of the life-cycle model.

The research effort devoted to testing and improving the
model in recent years reflects the model's importance for
policy. Many of the most talented investigators in economics
have spent much of their careers trying to improve our
understanding of the behaviour of individuals and families over
the life cycle; and directly or indirectly literally hundreds of
economists have worked on the model. Given the size and the
growth rate of this research endeavor it is only natural that
the division of labour has been practiced on an ever expanding
scale. Some researchers have focussed on commodity demands and
labour supply over the working phase of an individual's life
cycle, others have concentrated on behaviour in the retirement
phase, still others have concentrated on wealth accumulation
behaviour of families over the entire life cycle, and so on.
While this division of labour has enabled investigators to make
significant advances in our knowledge of particular aspects of
behaviour over the life cycle, some inconsistencies have arisen

between one person's findings and another's assumptions.[1] This is unfortunate because a general theory of household behaviour's central strength should be that it can explain the disparate elements of what we observe households doing; the model should be a unity.

The principal objective the research reported here is to establish a set of "facts" about the behaviour of married-couple families over the life cycle.[2] We begin by describing the data sources and our particular extracts from these, as well as our procedures for estimating consumption from data pertaining to expenditures.

2.   Description of the data

As we stated in the Preface, we have worked primarily with the internal working files for the six Canadian Famex Surveys over the thirteen year period from 1969 to 1982. The households in these surveys were selected from the Labour Force Survey

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[1] For example, in a recent paper on retirement, Gustman and Steinmeier assume that total consumption rises exponentially over an individual's entire lifetime whereas Hamermesh (1984) has shown that consumption falls quite rapidly in the retirement phase of the life cycle. If retirement and consumption decisions are in fact interdependent then the Gustman-Steinmeier retirement model may not explain what it purports to explain.

[2] In this context, it is interesting to re-read the long quotation from Lord Beveridge's farewell address to the London School of Economics that Richard Lipsey put on the cover of the first Canadian edition of his textbook. In this address Beveridge argued that, in the long run, empirical facts are critical to the development of economics as a science: "Einstein started from facts - the Morley-Michelson measurements of light, ... the unexplained aberrancies of the moon from its predicted place... It matters little how wrong we are with our existing

sampling frame, which is a multi-stage, stratified, clustered, probability sample. These surveys focus on a "spending unit", which is defined to be "... a group of persons dependent on a common or pooled income for the major items of expense and living in the same dwelling ... or ... financially independent persons living alone or as roomers" (1978 public use sample tape documentation, p. 130). The Statistics Canada documentation notes that the SU concept differs significantly from the concept of an "economic family" (EF), which is the microeconomic unit studied in Survey of Consumer Finances data on income, assets and debts. An EF is defined to be "... a group of individuals sharing a common dwelling unit and related by blood, marriage or adoption" (p. 130). For example, two unrelated people living together might form one SU but two EFs. In any event, these conceptual differences are not critical in the context of the present paper because we focus exclusively on married-couple families.

The 1969, 1978 and 1982 surveys were national in scope; they covered urban and rural areas throughout Canada. The other surveys covered only major urban centres and the 1972 survey only the eight cities - St. John's, Halifax, Montreal, Ottawa, Toronto, Winnipeg, Edmonton and Vancouver. To achieve comparability across the surveys we chose to consider only the residents of these eight cities. It is worth noting that the PUSTs for 1978, 1982 and 1984 do not identify the urban

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theories, if we are honest and careful with our observations."

household's city or town, but rather the region (Atlantic provinces, Quebec, Ontario, the Prairies and British Columbia) and the city size (population over 100,000, population between 100,000 and 50,000, and so on). The data used here could not be created from the PUSTs.

Along with information on total family expenditures, its components, changes in assets and debts, and family income, interviewers recorded information on many other characteristics of each household, including the education levels and occupations of both spouses. Unfortunately, we have been able to transfer only a small part of the information on the wife from the raw data files into our internal working files and thus we have been unable to make use of information on the wife's education, occupation or labour force status. Later in the paper, we suggest that subsequent research projects might devote resources to transfering much more information (such as weeks worked part-time and weeks worked full-time, for both spouses) from raw data tapes to our SAS data files.

It may be useful at this point to comment on what is known about the quality of these data. During the 1970s the Family Expenditures Section of Statistics Canada conducted a number of detailed validation studies of the data. Estimates of average income and statistics on income distribution derived from Famex turned out to be very close to corresponding estimates which were derived from the Survey of Consumer Finances and Revenue Canada's taxation statistics. Famex estimates of particular expenditure categories were also matched against corresponding

Personal Expenditure items from the National Income and Expenditure Accounts and against elements of the final demand matrix of the Input-Output structure. The only categories where Famex differed significantly were tobacco products (here the Famex total was 69% of the Personal Expenditure estimate and 73% of the final demand estimate, for 1978) and alcoholic beverages (the corresponding numbers were 46 and 47%). In short, the data are quite reliable and we consider them to be the best available for studying household decisions over the life cycle in Canada.[3] We shall outline the selection citeria for our extracts next and then proceed to describe the variables included in our analysis.

The surveys were conducted in February and March of 1970, 1973, 1975, 1977, 1979 and 1983 and the information on incomes and expenditures pertained to the immediately preceding calendar years. Some of the SUs existed, or contained members who were present, for only part of the year. In order to have all records on an equal footing we kept only those in which everyone was a full-time member. In addition, we adopted the convention of designating the husband as the household head and dated the household by his age. We were forced to drop about 10% of the married-couple households for the 1976 survey because they had female heads in married-couple families and it turned out that it was extremely difficult to swap information on the spouses to attain consistency in the records.

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3 We are indebted to Mr. Harry Champion, Chief, Family Expenditures Section of the Household Surveys Divsion for providing us with a number of validation studies, including one

In addition, to avoid the ambiguities that naturally arise in the spending patterns of the self-employed, for example those between personal and business expenses, we excluded those records in which the head of the SU reported that his major source of income originated from self-employment; for similar reasons, we also dropped the records of those engaged primarily in farming, fishing, forestry or logging. We included only those records in which the husband's age was between 25 and 80. Finally, we dropped the very few records that omitted information on the husband's education level or his occupation.

As noted above, the surveys reported total _expenditure_, and its components, whereas we were interested in obtaining estimates of _consumption_, which is the main variable the life cycle model purports to explain. For nondurable commodities, like food, it is probably reasonable to assume that, over the course of a year, consumption equals expenditure, although even with food, someone who was accumulating rare wines would cause us problems. The estimation of the flow of consumption services for durables is clearly more difficult, particularly shelter, which comprises so large a fraction of the average household's budget. We attempted to correct the expediture estimates in the following way. The survey reported each SU's total expenditure on shelter,[4] and for homeowners it reported separately

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titled "Validation of the Family Expenditure Survey Data" for 1978.

4 This item included expenditures on rented living quarters, owned living quarters, other accommodation, and water, fuel and

expenditures on repairs and maintenance, mortgage interest, and
the value of the home as of the 31st of December. We estimated
the shelter component of consumption for homeowners by
subtracting expenditures for repairs, maintenance and mortgage
interest from total expenditures on shelter, and adding 6
percent of the market value of the home as an estimate of
average maintenance expenditures plus the opportunity cost of
funds.[5]

Unfortunately the surveys did not publish data on the
market value of other consumer durables, such as automobiles and
household furnishings and equipment, though current expenditures
on these items were reported. Faced with these difficulties we
chose to omit expenditure categories that were, in some cases,
dominated by "lumpy" purchases of durables. In particular, we
obtained our estimate of the transportation component of
consumption by subtracting automobile purchases from total
expenditures on transportation and we ignored entirely
expenditures on household furnishings and equipment. A list of
the variables employed in this paper, as well as the mnemonic
attached to each, appears in Appendix A. We now turn to a
preliminary analysis of these data.

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electricity. The breakdown for "owned living quarters" included
property taxes and assessments, premiums for home insurance,
condominium charges and special levies, repairs and maintenance,
mortgage interest, and other expenses such as mortgage insurance
and legal charges.

[5] Our earlier research with the 1978 and 1982 p.u.s.t.'s
suggested that our results were not very sensitive to the choice
of this number.

3.   Preliminary analysis

Our analysis in the rest of this paper will focus on classifications of married-couple households primarily in terms of the head's characteristics; as noted above, we have very little information on the spouse in our data and we plan to correct this major defect in further work. On each of these surveys, the first line in the Personal Income section of the questionnaire asked each member of the household to state "Number of weeks worked (include holidays with pay) – full-time and part-time". The Statistics Canada working files collapse this information into two dummy variables, one for "working full-time" and another for "working part-time". The "working full-time" dummy means that the person worked at least 26 weeks full-time and at least 50 weeks full-time or part-time. If the person was unemployed for the full year, he was put into the omitted category (head not working or retired, HNWR), and everyone who did not fall into either the first or third categories was put into the part-time category. The PUSTs for 1978 and 1982, however, report the raw answers to these questions for both spouses. As a first step in analyzing these data, we took an extract from the 1982 PUST[6] using the same selection criteria as in the present paper except that we examined married couples where the head's age was between 55 to

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6 Remember that this is a national sample that covers the eight cities studied in this paper as well as other major urban centres and rural areas.

65. Of the 932 observations so obtained, only 43 men (less than 5%) worked any weeks part-time, and some of these stated that they were working 52 weeks full-time (so the weeks worked part-time were in a second job), and only 7 (less than 1%) worked some weeks full-time and some weeks part-time. We obtained similar results for the 1984 PUST. If these data are correct, it is rare for older married men to work part-time and for almost all of them retirement is a discontinuous leap from full-time work to no work. This contrasts with what recently seems to have become the standard view of male retirement behaviour as a progression from full-time, to part-time, to complete retirement (see Gustman and Steinmeier (1986)). It is worth noting that our description does not apply to wives' labour force behaviour; it is much more common for married women to work some weeks part-time and to move from full-time to part-time or vice versa over a year. In the light of this information we have broken our extracts for each year into those with a working head aged 25 to 65 and those with a non-working (or retired) head aged 58 to 80 (all others are excluded).

Having done so, it is also instructive to examine the means of our variables by city for each of the working and non-working files. The heterogeneity across cities at a point in time and across time for any one city is startling. For example, the working files show that in 1969 only 38% of those married couples living in Montreal owned their homes, in contrast to 61%

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in Toronto and an average 64% in the other six cities. By 1982, these numbers had changed to 61%, 74% and 73%, respectively. The immigration variables and many others reveal similarly large changes across cities and over the 1969-1982 period.

We report the means for some key variables in Table 1. We have used the all-items CPI for 1969 to 1982 to convert data from the first five cross-sections into 1982 dollars. For the working files, Statistics Canada's estimate of total current consumption, TCC, exhibits an upward trend over the period but the growth rate is anything but uniform. Fairly steady growth is observed from 1969 to 1974, then a sharp acceleration occurs in 1976, and then declines in 1978 and again 1982. Our measure of consumption, ATCC, displays the same pattern, as do wages and salaries, WAS, and family after-tax income, AFTAXY, except that the latter grows slowly rather than falling slowly over the 1978 to 1982 period. The ratios of TCC and ATCC to AFTAXY reveal a downward trend, although the decline is clearer in the TCC/AFTAXY ratio. This is consistent with observed increases in personal saving rates observed in National Accounts data over this time period.

AFTAXY in the non-working/retired files is flat at $14,200 from 1969 to 1974, then it jumps by $3400 in 1976, declines in 1978 and then jumps upward again in 1982, to about $19,500. The average propensity to consume, particularly ATCC/AFTAXY, tends to move in the opposite direction and exhibits a precipitous decline from numbers close to unity to 0.79 or 0.74. It would be interesting to estimate how much of the increase in the personal

saving rate is attributable to changes in the behaviour of the old as opposed to that of the young.

Using the data in Table 1, we have calculated annual growth rates and compared these to the corresponding growth rates for real GNE and the real interest rate[7] in Table 2. As one might expect, ATCC is a little smoother than TCC, presumably because our estimate of housing services is more stable than expenditures on housing. The data suggest that TCC, WAS and AFTAXY are highly correlated in the working files; the consumption-income relationship looks to be much weaker in the not-working-retired files where consumption often falls or remains stable when incomes are stable or increase. There is no apparent relationship between real interest rates and any of the other variables.

We now turn to a more careful examination of the data. We want to study the consumption, work, earnings and after-tax income patterns of individual cohorts. Our earlier work with the 1978 and 1982 PUSTs showed that each of these varies in important ways with age, educational level, occupation, immigration status, number of children and other adults in the household, region and city size. If we had a very large data set we could classify households by each characteristic, take the means by head's age, and then proceed to study the patterns revealed by these means. For example, we could observe the

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7 We have measured the real interest rate by subtracting the percentage change in the GNE price deflator from the yield on six-month treasury bills, over each period.

consumption patterns of a household where the head was: in a
blue-collar occupation, in the lowest educational category,
Canadian born, childless, and a resident of Montreal, between
ages 25 (in 1969) and 38 (in 1982). Some of the working files
(with head's aged 25 to 65), however, have less than 2000
observations, and some of the non-working/retired files have
less than 200 observations, and thus, there is simply not enough
data to make it feasible to calculate averages for each age,
according to each relevant classification. One possibility would
be to aggregate over some of the characteristics and create,
say, 5-year age cohorts for each cross-section and then match
cohorts across the six years. Another would be to estimate a
consumption equation using a flexible functional form, obtain
predicted values for each age and characteristic and then match
the predicted values across the surveys. Still another procedure
would be to use all the data simultaneously to estimate the
consumption behaviour of different cohorts and household types.
We think it is an open question as to how best to use the data.
In the present paper, we employ a variant of the second
alternative.

　　　For each cross-section and for each of the working and non-
working files, we estimate an equation for the variable of
interest, our measure of consumption (ATCC) for example. The
equation is a cubic in head's age. For the working files, we
include the number of adults in addition to the head and spouse

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(AMHW), the number of children under the age of 18 (KO17), four dummy variables for head's education (HED) and two dummy variables for head's occupation (HOC), and a complete set of interactions between these eight variables and the age variables. In addition, we have included a part-time dummy (PTIME) and seven city dummies. Putting the omitted categories together, the basic equation is for a married couple, resident in Montreal, with no children or other adults present, working full-time, with the head having the lowest level of education and holding a blue-collar job. Having estimated this equation for each of the cross-sectional working files, we can generate predicted values of consumption, for each age and for a specific menu of characteristics, in terms of that particular year's dollars. These values can be converted to 1982 dollars and the consumption profiles of particular age cohorts can be constructed by matching those with the same characteristics across the six surveys. In this way, one can study the consumption patterns for quite different types of households. The non-working files are handled in exactly the same way, except that the HOC and PTIME variables are omitted.

As we noted above, the surveyors recorded a particular occupational category only if the person had worked at all in the previous year; otherwise, the head was coded into the not-working-retired category (HNWR). We have also estimated probit equations for the probability that the head is in the HNWR category. Here we expanded the cubic age function to include a knot at age 60 in the square and cubic terms (and thus we are

using a spline function in age) to permit extra flexibilty at typical retirement ages. The other right-hand-side variables in these equations were the same as those in the regressions for the retired files, except that all interactions with the age terms were omitted.

4. Preliminary results

In earlier research we have identified two "typical" types of households — "blue-collar" (BC) and "white-colllar" (WC) — and we shall report results for just these two here, but we should emphasize that the control variables in our regression equations permit us to study the behaviour of a great many different types of households. In particular, we could easily extend these results to describe the consumption and earnings patterns of married couples with children for part of their lives.

We define a BC household to be one in which the head works in a blue-collar job and is in the lowest educational category. A WC household is one in which the husband is employed in a white-collar job (clerical, sales or services) and has a high-school education. As noted earlier, these surveys did not (and still do not) ask those who are retired to identify their former occupation. As a consequence, the BC-WC distinction turns solely on HED in the retirement phase of the life cycle.

(a) Consumption

We present graphs of predicted values of our measure of

consumption (ATCC, in 1982 dollars), against husband's age, in Figure 1. Panels (a) and (b) are BC and WC for those who are working, ages 25 to 65, and (c) and (d) are BC and WC for those who are not working or retired, ages 58 to 80. The graphs in panels (a) and (b) tend to be hump-shaped, WC more than BC, but some of them (1976 and 1982 for BC and 1978 for WC) fall significantly immediately after age 25. It is possible that the resulting "wavy" patterns are generated by a very few high or low observations ("outliers") that distort the ordinary least squares equation and we intend to investigate these possibilities in future research. What is more striking perhaps is the extent to which the profiles for 1976 to 1982 cross each other. Presumably this reflects the zero or negative growth rates in average consumption for these years (see Tables 1 and 2). The 1976 and 1982 profiles are almost identical for BC. For WC, 1982 has the same shape as 1976 and is always _less_ than 1976. In a steady state, the cross-sectional consumption-age profiles would be replicas of each other, unless productivity increases were shifting them upwards over time at a steady rate. The pictures displayed here point to a very different "reality", one that in no way resembles the pictures one would expect to see in a steady state.

Panels (c) and (d) indicate a general tendency for consumption to fall in retirement, but several profiles rise for at least a few years and the graphs intersect each other to an even greater extent than in the first two panels. Once again, it would be useful to know how much of this variability is

attributable to outliers. It may be, of course, that the many significant adjustments to public and private pensions over this period really did generate these shapes for "typical" BC and WC households.

The patterns revealed in Figure 2 for TCC are very similar to those of Figure 1, across the six years and four household categories. The TCC numbers tend to be higher at younger ages and lower at older ages because TCC includes expenditures on consumer durables and housing while ATCC attempts to measure only the services from these durables.

(b) Pre-tax earnings and after-tax incomes

Inspection of the graphs in Figure 3 reveals shapes for the age-earnings profiles that are much like those for consumption. Once again, the BC profiles tend to be flat or to decline between ages 25 and 50, and then fall off quite sharply, whereas the WC profiles are more hump-shaped, peaking between 35 and 45. We should emphasize that we have attempted to control for those households in which the head was working part-time (the pictures drawn here are for those working full time), but we have no information on the labour supply behaviour of anyone except the husband. As a consequence, we cannot tell whether it is a decline in husbands' wages or a decrease in the earnings of other members of the household that accounts for the decline in household earnings between ages 45 and 65.

There is also a strong tendency for WC to earn more than BC, although this is not always true, as the 1982 BC profile

after age 25 demonstrates. As we noted above, however, OLS equations can be very sensitive to outliers and our results should be checked for this possibility.

Panels (a) and (b) of Figure 4 illustrate the remarkable similarity in shape between the household's pre-tax earnings and its after-tax income, year by year, for BC and WC households. One might have thought that significant wealth-holding at later ages combined with large changes in real interest rates might have induced more divergences in the two series.

It is difficult to discern a typical pattern to either BC or WC cross-sectional retirement incomes from panels (c) and (d) of Figure 4. Average incomes of BC are clearly lower than those for WC. Focussing on ages 70 to 74, both household types appear to have been better off in 1978 and 1982 than they were in 1969, but what accounts for the apparent decline in real incomes (particularly for WC) between 1978 and 1982, the latter being a year of very high real interest rates? Are WC pensions not as well indexed for inflation as those of BC workers?

A careful comparison of the (c) and (d) panels of Figures 2 and 4 indicates many occasions when consumption exceeded incomes in the early cross-sections, but very few in the more recent ones. The graphs reflect the data in Table 1 – the elderly have been saving a much higher fraction of their incomes in recent years.

(c) Retirement

As we stated above, we have estimated equations for the

probability that the head is in the not-working-retired category (HNWR). The predicted values from these equations, contained in Tables 3 (BC) and 4 (WC),[8] reveal a strong tendency towards earlier retirement, particularly for households with lower educational levels. For example, the data imply that the probability that a BC head at age 60 was in the HNWR category was 0.17 in 1969 and that this had jumped to 0.31 in 1978 and to 0.36 in 1982. The corresponding numbers for a WC head are 0.10, 0.21 and 0.18.

The data also confirm our strong prior belief that BC households tend to retire earlier than WC. In Figure 5 ,we have averaged over the six cross-sections and graphed the probability of HNWR against hushand's age, for BC and WC. The graphs show that approximately half of BC heads are retired at age 63 while half of WC heads are retired at age 65. We now use these numbers to simulate "typical" patterns of consumption, earnings and after-tax incomes for BC and WC cohorts.

5.   Simulated cohorts

A key feature of the above results is that the level and shape of cross-sectional profiles has changed markedly over the 1969 to 1982 period. For the purposes of simulation, however, one may want archetypical patterns for cohorts, ones that eliminate business cycle and non-stationary effects. In this section we create averages of the cross-sectional profiles and

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8 The distinction between BC and WC here turns solely on HED.

use these to simulate patterns for individual cohorts.

In Figure 6, we have graphed ATCC, averaged over the six surveys, against head's age for typical BC and WC households, with their associated average retirement ages of 63 and 65. As we observed earlier, WC appears to be more hump-shaped than BC, but both decline substantially prior to and after retirement. The data in Table 1 imply an average growth in the mean of ATCC of between 1 and 2 percent per year over the 1969 to 1982 period. Figure 7 illustrates life-cycle consumption patterns of BC and WC cohorts based on a steady growth rate of 1% in the cross-sectional profile of Figure 6, that is, as household heads age and move out the cross-sectional profile, the profile is assumed to shift upwards at the rate of 1% per year. The upward movement in the cross-sectional profiles exaggerates the rising portions typical at younger ages and dampens the falling portions at older ages so that now both BC and WC are hump-shaped. BC consumption is fairly flat in retirement whereas WC's is actually hump-shaped.

We have repeated this procedure to produce Figures 8 and 9 for wages and salaries (ages 25 to 65) and Figures 10 and 11 for after-tax incomes. With 1% growth in the cross-sectional profiles both BC and WC age-earnings profiles are hump-shaped, with peaks at 54 and 48, respectively. As we noted above, without more information on the wife it is difficult to know how much of the decline in the household's earnings is attributable

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to the earnings patterns of each spouse. It may be that husband's earnings are not hump-shaped at all and that the decline observed here results from wives retiring from the labour force. The after-tax income profiles for BC and WC cohorts in Figure 11 are much less hump-shaped than those for earnings because the income-tax system is progressive and property income is more important later in the life cycle. In particular, that WC declines very little while BC falls substantially between age 50 and retirement may be induced by their different accumulation behaviour. After retirement, BC after-tax real incomes are very stable while WC start much higher and tend to fall. One possibility is that social security, which, unlike private pensions, is indexed for inflation, is a larger component of retirement incomes in blue-collar households.

These data may be used to get some idea of saving behaviour by each household type over the life cycle. Figure 12 graphs the ratio of our measure of consumption (ATCC) to after-tax incomes against the husband's age.[9] WC households tend to save a higher proportion of their disposable incomes at almost all ages. The hump-shapes during the working phase of the life cycle means that consumption is more hump-shaped than incomes. Furthermore, with the exception of BC immediately after retirement, the pictures indicate that both types of household save after

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9 Because the cohort profiles are simply blow-ups of the cross-sectional averages, the ratios generated from the data in Figures 6 and 10 are identical to those generated from 7 and 11.

retirement and the saving rate <u>rises</u> with age. In Figure 13 we hace repeated this exercise for TCC on just the working files. Now WC consumption-income ratio declines throughout and BC peaks earlier because younger households tend to have much larger mortgages than older ones.

It may be difficult to devise theoretical explanations that are consistent with the pictures we have presented. In particular, the question of why married couples save so large a proportion of their disposable incomes late in the life cycle, a question that lies at the heart of tax reform discussions, should be addressed in future research.

6.   Summary and conclusions

This study forms another part of our research program to use Canadian data to establish a set of empirical facts upon which more realistic life-cycle models can be constructed. The research suggests that the common presumption of numerical-simulation life-cycle models (e.g. Summers (1981), Driffill and Rosen (1983) and Auerbach, Kotlikoff and Skinner (1983)) that consumption-age profiles are upward-sloping is not supported. Moreover, not only do our estimates of consumption-age profiles slope downwards, but, in certain cases, they fall so sharply near retirement that considerable doubt is cast upon the frequently-encountered assumption that the marginal utility of consumption is independent of the quantity of leisure consumed.

Hamermesh estimated (from US panel data) that immediately after retirement married couples reduce spending by 5% per annum (1984, p.5). We find slower rates of decrease both before retirement (3% for BC and 1% for WC) and virtually no change immediately after retirement, but rather a huge decrease right at retirement (29% for BC and 20% for WC). These differences may arise in part from the way in which we have modelled consumption and retirement. In this work we have treated them sequentially; we have studied consumption behaviour conditional on retirement status. One might expect, however, that in many cases consumption and retirement are jointly determined. Those that are studied in the retirement file (or in the consumption file for that matter) are not a random sample. Those with high levels of consumption are likely to behave differently from those with low levels of consumption when it comes to retirement. As a consequence, the consumption regressions should perhaps include the inverse of the Mills ratio (derived from the retirement equations) to control for retirement selection bias.

We have incorporated the discreteness of the retirement decision into the work in this paper in a very simple way. Though independent from the consumption decision, it seems consistent with data from the PUSTs which suggests that married males' tend to move from full-time work to complete retirement without ever working part-time. In further work we intend to model consumption and retirement simultaneously, and if possible, to incorporate the labour-force behaviour of wives. To do this we need to draw more information from Statistics

Canada's raw working files which code all the information
obtained from the questionnaires. Ideally the model should
explain the joint determination of family labour supply and
consumption decisions over the life cycle. This would seem to be
an important policy area in the light of recent changes to CPP,
which among other things, permit an individual to start CPP
benefits anytime between ages 60 and 70. Better information on
wives' labour market behaviour would also make it easier to
interpret family age-earnings profiles.

The research raises a number of additional questions. What
accounts for the dramatic upward trend in the saving rate of the
elderly? How sensitive are these results to outliers and
modifications of the simple cubic functional form we have
assumed for age? What are the connections between business
cycles and the shapes and levels of the cross-sectional
profiles? Clearly there is no shortage of interesting and
important questions to pursue in future research.

Appendix A

Note: Unless otherwise stated, all variables are dummies.

1.   Variables for husband

Education

HED1 — partial secondary education
HED2 — completed secondary education
HED3 — some post-secondary education or post-secondary
certificate or diploma
HED4 — university degree
Omitted category — less than 9 years of elementary and secondary
education

Occupation

HOC1 — managerial, administrative and related occupations or
occupations in natural sciences, engineering, mathematics,
social sciences, religion, medicine and health or teaching, or
artistic, literary or recreational occupations
HOC2 — clerical, sales or service occupations
HNWR — not working, including retired
Omitted category — mining, processing and machining, product
fabricating, assembling and repairing, construction and other
occupations not stated above

Employment status

FTIME — working full-time
PTIME — working part-time
Omitted category — not employed

Note: Those surveyed were asked how many weeks they had worked
full-time and how many weeks worked part-time. The "working
full-time" dummy here means that the person worked at least 26
weeks full-time and at least 50 weeks full-time or part-time. If
the person was unemployed for the full year, he was put into the
omitted category, and everyone who did not fall into either the
first or third categories was put into the part-time category.

Immigration status

HB46 — immigrated before 1946
HA45 — immigrated after 1945
Omitted category — Canadian born

2.   Household incomes and expenditures

SHEL1 — shelter expenditures

SHEL2 - estimate of value of housing services (SHEL1 less
expenditues on repairs, maintenance and mortgage interest plus
6% of market value of home)
TCC - total current consumption
ATCC - adjusted total current consumption (TCC less automobile
and truck purchases, household furnishings and equipment, and
SHEL1, plus SHEL2)
AFTAXY - after-tax income (income before taxes plus other money
receipts less personal taxes, UI and C/QPP contributions)
WAS - wages and salaries
NSAVE - narrow definition of saving (net change in assets and
liabilities plus account balancing difference)
BSAVE - broad measure of saving (NSAVE plus life insurance
premiums and contributions to government and private pension
plans)

3.   Other variables

City dummies

STJ - household resided in St. John's on 31st December
HFX - Halifax
MTL - Montreal
OTT - Ottawa
TOR - Toronto
WPG - Winnipeg
EDM - Edmonton
VAN - Vancouver

Additional persons

AMHW - the number of members of the SU who were 18 years of age
and over, in addition to the husband and wife
K017 - the number of members of the SU who were under the age of
18

28

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Table 1: Means of the data, in 1982 dollars

Working files

Variable	1969	1972	1974	1976	1978	1982
TCC	23398	24297	25607	28141	27883	27370
ATTC	21628	22438	24298	26492	26263	26086
WAS	28901	31532	33742	37852	37181	36740
AFTAXY	26328	27795	29572	33342	33003	33247
TCC/AFTAXY	.89	.87	.87	.84	.84	.82
ATCC/AFTAXY	.82	.81	.82	.79	.80	.78

Non-working/retired files

TCC	13370	12429	12521	14797	14005	14461
ATCC	13559	13359	14002	15900	15431	15339
AFTAXY	14266	14118	14210	17645	16458	19482
TCC/AFTAXY	.94	.88	.88	.84	.85	.74
ATCC/AFTAXY	.95	.95	.99	.90	.94	.79

Table 2: Annual growth rates and interest rates, as percentages

Working files

Variable	1969-1972	1972-1974	1974-1976	1976-1978	1978-1982
TCC	1	3	5	-1	-1
ATTC	1	4	4	-1	0
WAS	3	3	6	-1	-1
AFTAXY	2	3	6	-1	0

Non-working/retired files

TCC	-3	0	9	-3	0
ATCC	-1	2	7	-2	-1
AFTAXY	0	0	11	-3	4
REAL GNE	5	5	4	3	1
REAL INTEREST RATES	2	-6	-3	1	2

Table 3: Probabilities of being in the head not-working-retired
category as a function of age, for those with less than 9 years of
elementary and secondary education

AGE	1969	1972	1974	1976	1978	1982
25	0.07	0.23	0.17	0.17	0.12	0.08
26	0.06	0.21	0.15	0.16	0.11	0.08
27	0.05	0.20	0.12	0.14	0.10	0.08
28	0.04	0.18	0.11	0.13	0.10	0.08
29	0.04	0.17	0.09	0.12	0.09	0.08
30	0.03	0.16	0.08	0.11	0.08	0.08
31	0.03	0.15	0.07	0.10	0.08	0.08
32	0.03	0.14	0.07	0.09	0.07	0.08
33	0.03	0.13	0.06	0.08	0.07	0.08
34	0.03	0.12	0.06	0.08	0.07	0.08
35	0.03	0.12	0.05	0.07	0.06	0.08
36	0.02	0.11	0.05	0.07	0.06	0.08
37	0.03	0.11	0.05	0.07	0.06	0.08
38	0.03	0.10	0.05	0.07	0.06	0.08
39	0.03	0.10	0.05	0.07	0.06	0.08
40	0.03	0.10	0.05	0.06	0.06	0.08
41	0.03	0.09	0.06	0.06	0.06	0.08
42	0.03	0.09	0.06	0.07	0.06	0.08
43	0.04	0.09	0.06	0.07	0.06	0.08
44	0.04	0.09	0.07	0.07	0.06	0.08
45	0.04	0.09	0.07	0.07	0.07	0.09
46	0.05	0.09	0.08	0.07	0.07	0.09
47	0.05	0.09	0.09	0.08	0.07	0.09
48	0.06	0.09	0.10	0.08	0.08	0.10
49	0.06	0.10	0.11	0.09	0.09	0.11
50	0.07	0.10	0.12	0.10	0.09	0.11
51	0.08	0.10	0.13	0.10	0.10	0.12
52	0.09	0.11	0.15	0.11	0.12	0.14
53	0.10	0.12	0.17	0.12	0.13	0.15
54	0.11	0.12	0.18	0.14	0.15	0.17
55	0.12	0.13	0.21	0.15	0.16	0.19
56	0.13	0.14	0.23	0.17	0.19	0.21
57	0.14	0.15	0.25	0.19	0.21	0.24
58	0.15	0.17	0.28	0.21	0.24	0.27
59	0.16	0.18	0.30	0.23	0.27	0.31
60	0.17	0.20	0.33	0.26	0.31	0.36
61	0.19	0.23	0.37	0.29	0.36	0.41
62	0.22	0.28	0.43	0.35	0.41	0.47
63	0.26	0.35	0.51	0.41	0.48	0.54
64	0.32	0.44	0.60	0.49	0.56	0.62
65	0.40	0.54	0.69	0.58	0.63	0.69
66	0.49	0.64	0.78	0.67	0.71	0.75
67	0.59	0.74	0.85	0.75	0.78	0.81
68	0.68	0.83	0.91	0.82	0.84	0.86
69	0.76	0.89	0.94	0.87	0.89	0.90
70	0.83	0.93	0.97	0.91	0.93	0.93
71	0.88	0.96	0.98	0.94	0.95	0.95
72	0.92	0.98	0.99	0.96	0.97	0.96
73	0.94	0.98	0.99	0.97	0.98	0.97
74	0.96	0.99	0.99	0.98	0.99	0.98
75	0.97	0.99	0.99	0.98	0.99	0.98
76	0.97	0.99	0.99	0.98	0.99	0.99
77	0.97	0.99	0.99	0.97	1.00	0.99
78	0.97	0.99	0.99	0.97	1.00	0.99
79	0.96	0.98	0.98	0.95	1.00	0.99
80	0.95	0.95	0.95	0.92	1.00	0.98

probit:

- educ
- immigr
- city
- a, a^2, a^3
- $((a-60)^2 \lceil 0)^2$
- $((a-60)^3 \lceil 0)^3$

Table 4: Probabilities of being in the head not-working-retired
category as a function of age, for those with a high-school education

AGE	1969	1972	1974	1976	1978	1982
25	0.04	0.10	0.06	0.06	0.07	0.03
26	0.03	0.09	0.05	0.05	0.07	0.03
27	0.03	0.08	0.04	0.05	0.06	0.03
28	0.02	0.07	0.03	0.04	0.05	0.03
29	0.02	0.07	0.03	0.04	0.05	0.03
30	0.02	0.06	0.02	0.03	0.05	0.03
31	0.01	0.06	0.02	0.03	0.04	0.03
32	0.01	0.05	0.02	0.03	0.04	0.03
33	0.01	0.05	0.02	0.02	0.04	0.03
34	0.01	0.04	0.01	0.02	0.04	0.03
35	0.01	0.04	0.01	0.02	0.03	0.03
36	0.01	0.04	0.01	0.02	0.03	0.03
37	0.01	0.04	0.01	0.02	0.03	0.03
38	0.01	0.03	0.01	0.02	0.03	0.02
39	0.01	0.03	0.01	0.02	0.03	0.02
40	0.01	0.03	0.01	0.02	0.03	0.02
41	0.01	0.03	0.01	0.02	0.03	0.03
42	0.01	0.03	0.02	0.02	0.03	0.03
43	0.02	0.03	0.02	0.02	0.03	0.03
44	0.02	0.03	0.02	0.02	0.03	0.03
45	0.02	0.03	0.02	0.02	0.04	0.03
46	0.02	0.03	0.02	0.02	0.04	0.03
47	0.03	0.03	0.03	0.02	0.04	0.03
48	0.03	0.03	0.03	0.02	0.04	0.03
49	0.03	0.03	0.03	0.03	0.05	0.04
50	0.04	0.03	0.04	0.03	0.05	0.04
51	0.04	0.04	0.04	0.03	0.06	0.04
52	0.05	0.04	0.05	0.04	0.07	0.05
53	0.05	0.04	0.06	0.04	0.08	0.06
54	0.06	0.04	0.07	0.05	0.09	0.06
55	0.06	0.05	0.08	0.05	0.10	0.08
56	0.07	0.05	0.09	0.06	0.12	0.09
57	0.08	0.06	0.10	0.07	0.13	0.10
58	0.09	0.07	0.12	0.08	0.16	0.12
59	0.09	0.07	0.13	0.09	0.18	0.15
60	0.10	0.08	0.15	0.11	0.21	0.18
61	0.11	0.10	0.18	0.13	0.25	0.22
62	0.13	0.13	0.22	0.16	0.30	0.27
63	0.17	0.17	0.28	0.21	0.36	0.33
64	0.22	0.24	0.36	0.27	0.44	0.40
65	0.28	0.33	0.46	0.35	0.52	0.47
66	0.36	0.43	0.57	0.44	0.60	0.55
67	0.46	0.54	0.67	0.53	0.68	0.63
68	0.55	0.66	0.77	0.62	0.76	0.71
69	0.65	0.75	0.84	0.71	0.82	0.77
70	0.73	0.83	0.89	0.78	0.87	0.82
71	0.80	0.89	0.93	0.83	0.91	0.86
72	0.85	0.92	0.95	0.87	0.94	0.90
73	0.89	0.95	0.96	0.90	0.96	0.92
74	0.92	0.96	0.97	0.91	0.97	0.94
75	0.93	0.97	0.97	0.92	0.98	0.95
76	0.94	0.97	0.97	0.92	0.99	0.95
77	0.94	0.96	0.97	0.91	0.99	0.96
78	0.94	0.95	0.95	0.89	0.99	0.96
79	0.93	0.92	0.91	0.85	0.99	0.95
80	0.90	0.87	0.84	0.78	0.99	0.94
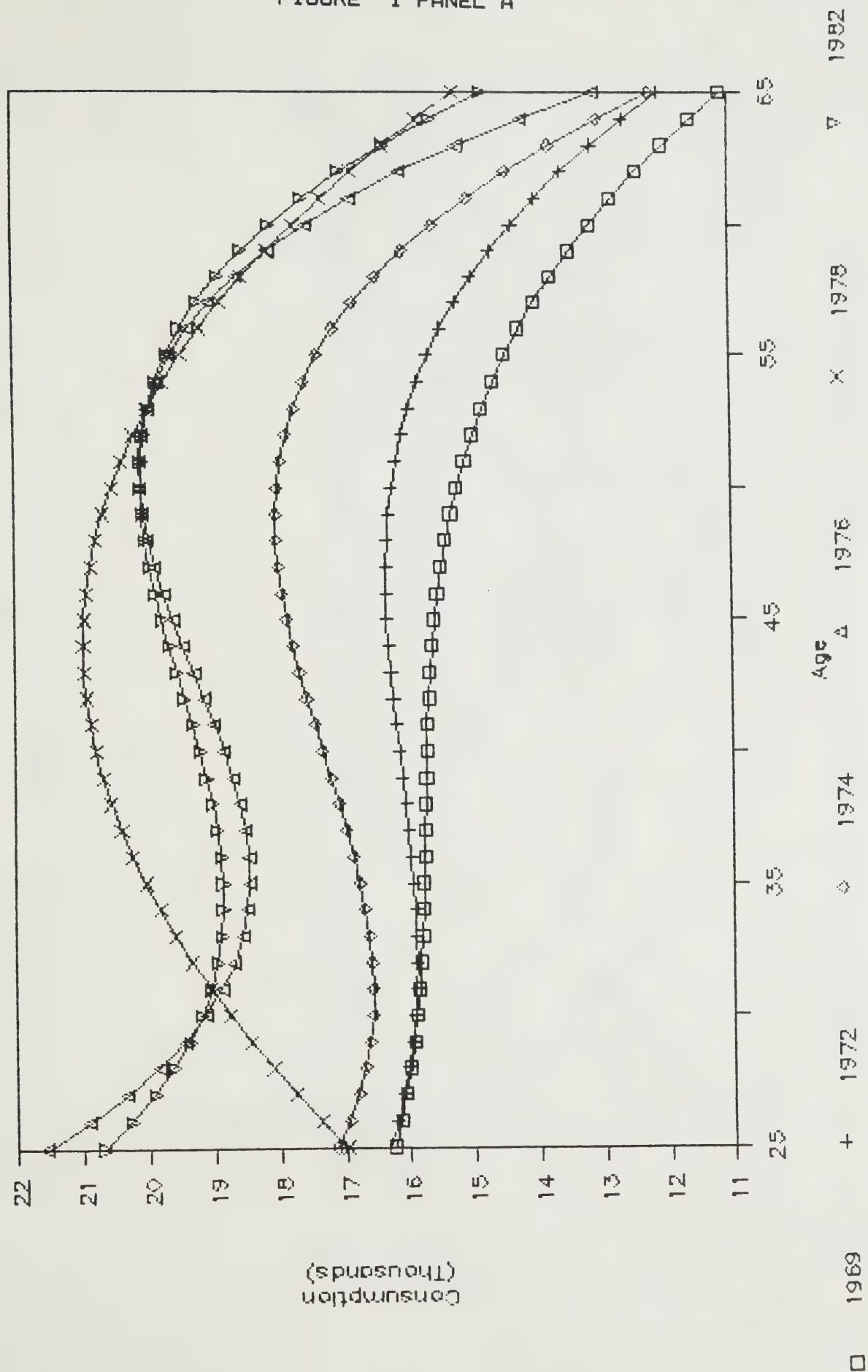
FIGURE 1 PANEL A

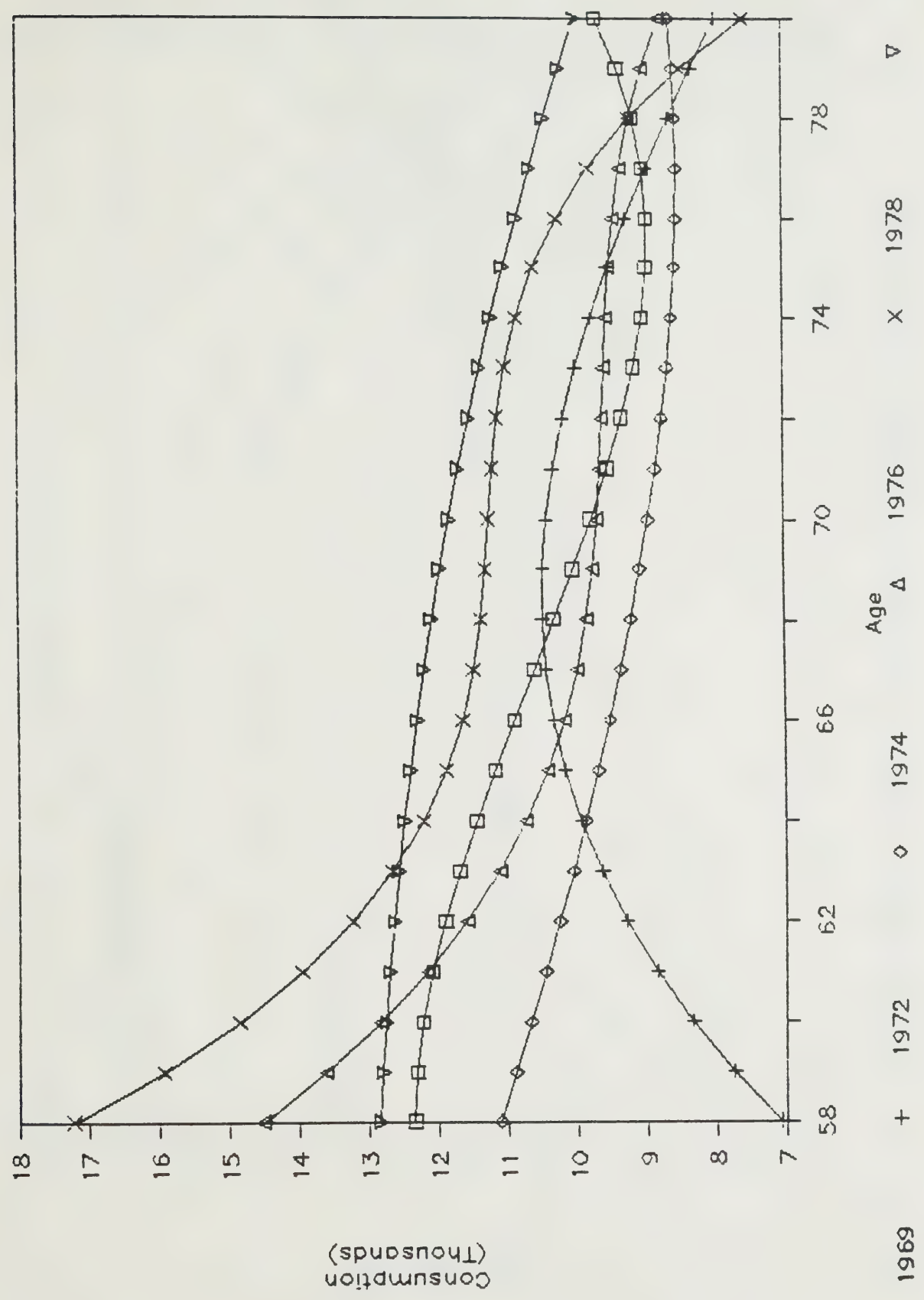Consumption, Blue Collar, Working

FIGURE 1 PANEL B

Consumption, White Collar, Working
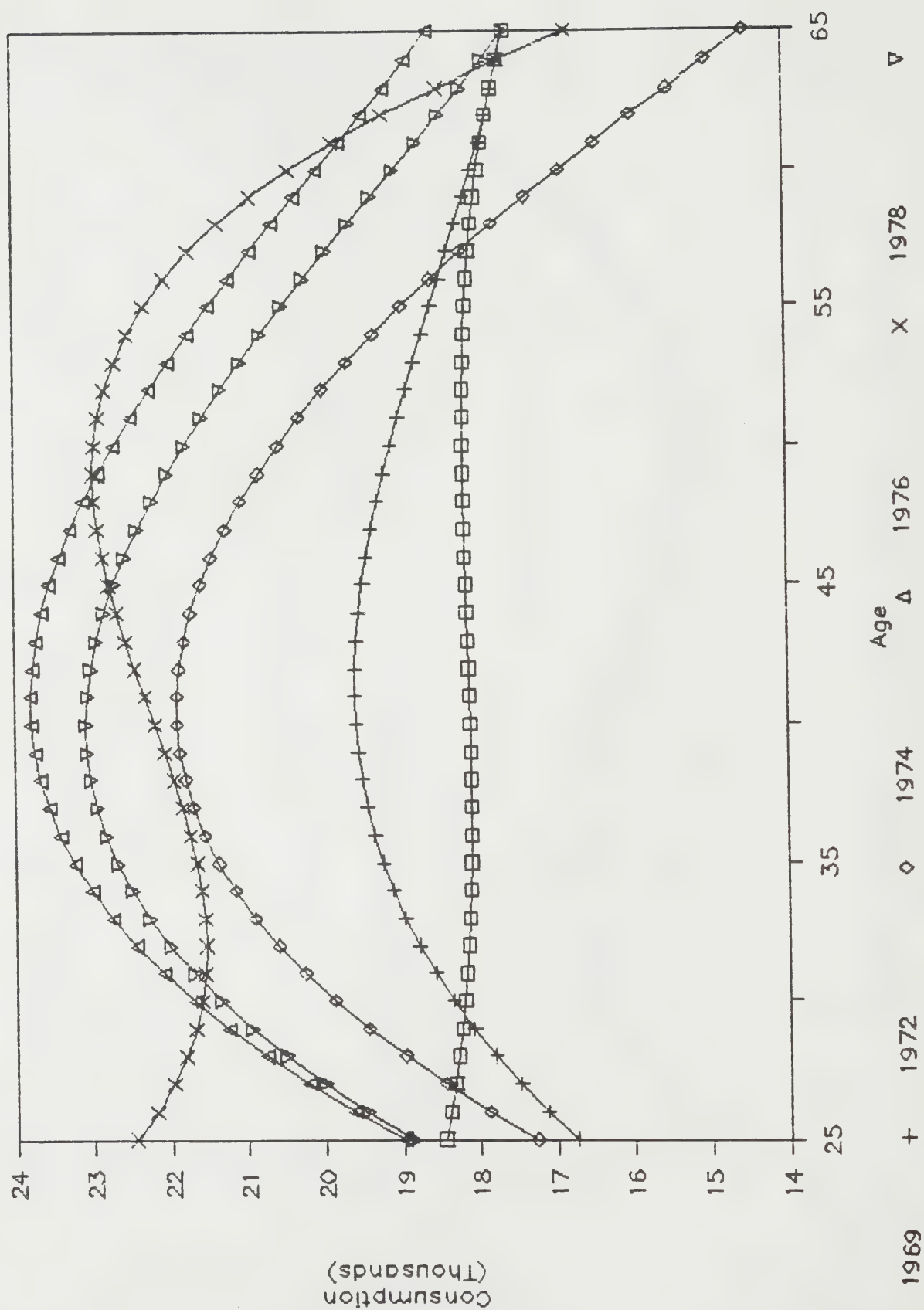
FIGURE 1 PANEL C

Consumption, Blue Collar, Retired

FIGURE 1 PANEL D

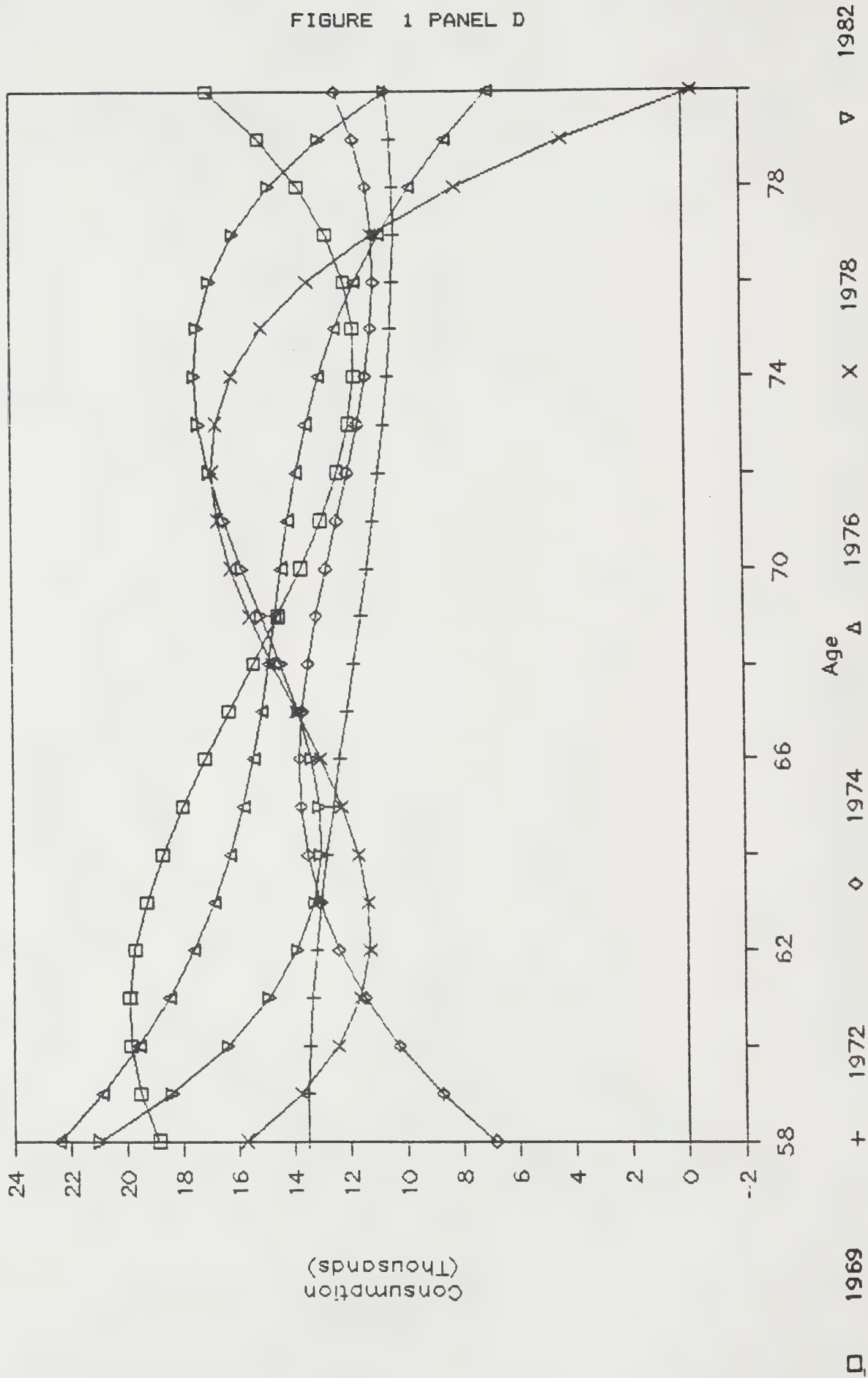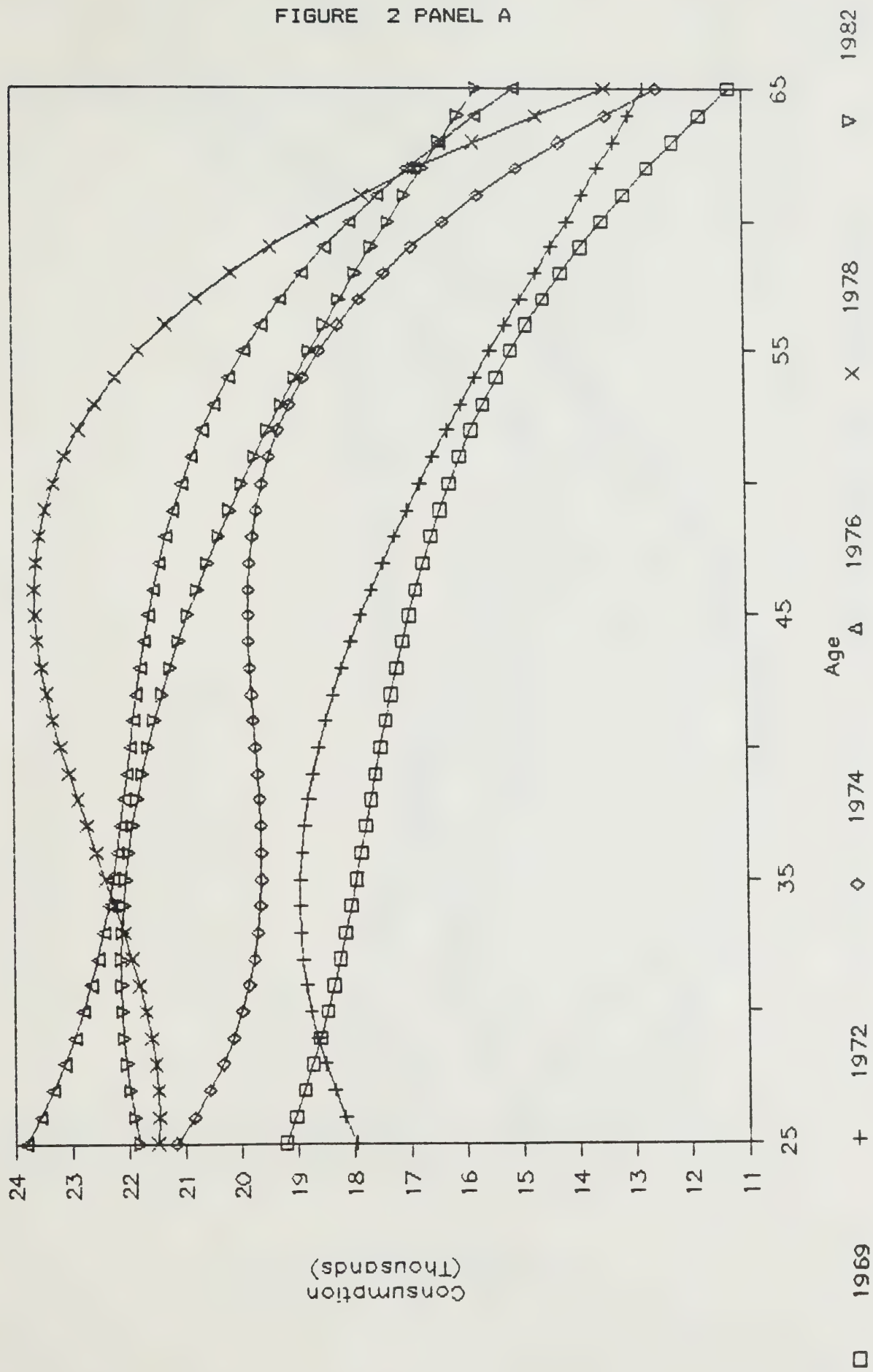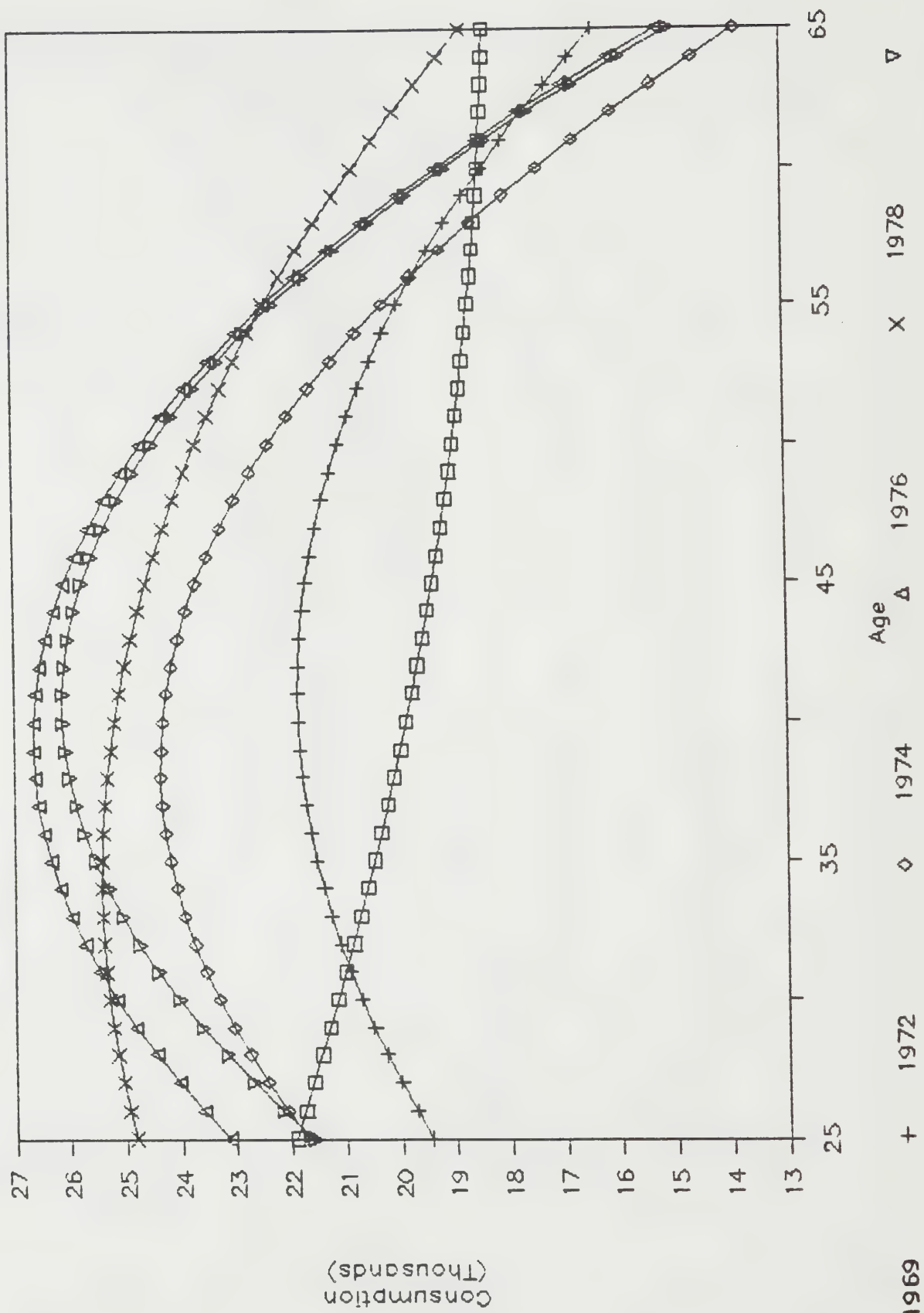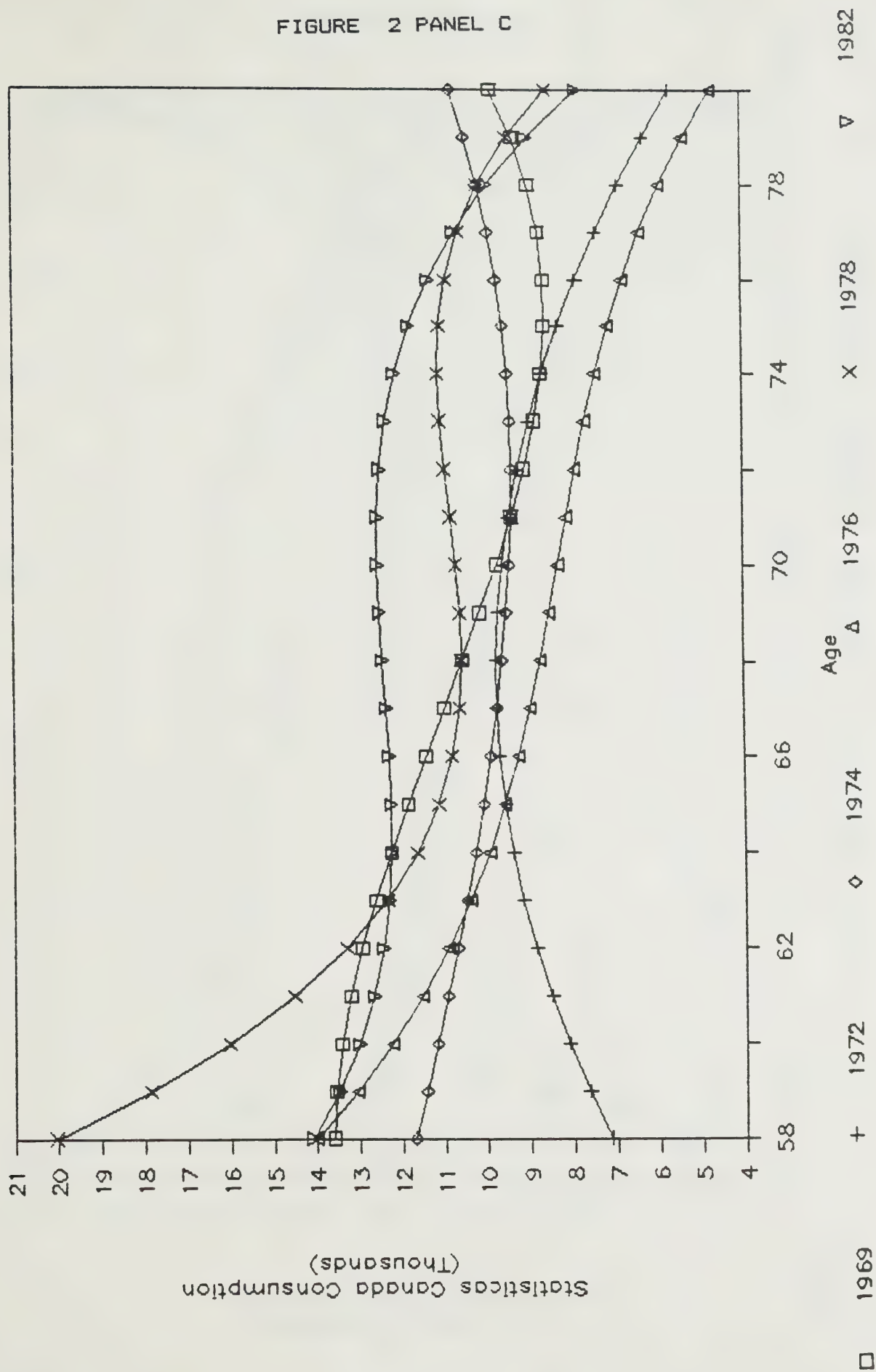Consumption, White Collar, Retired

FIGURE 2 PANEL A

S.C. Consumption, Blue Collar, Working

FIGURE 2 PANEL B

S.C. Consumption, White Collar, Working

S.C. Consumption, Blue Collar, Retired

FIGURE 2 PANEL C

FIGURE 2 PANEL D

S.C. Consumption, White Collar, Retired
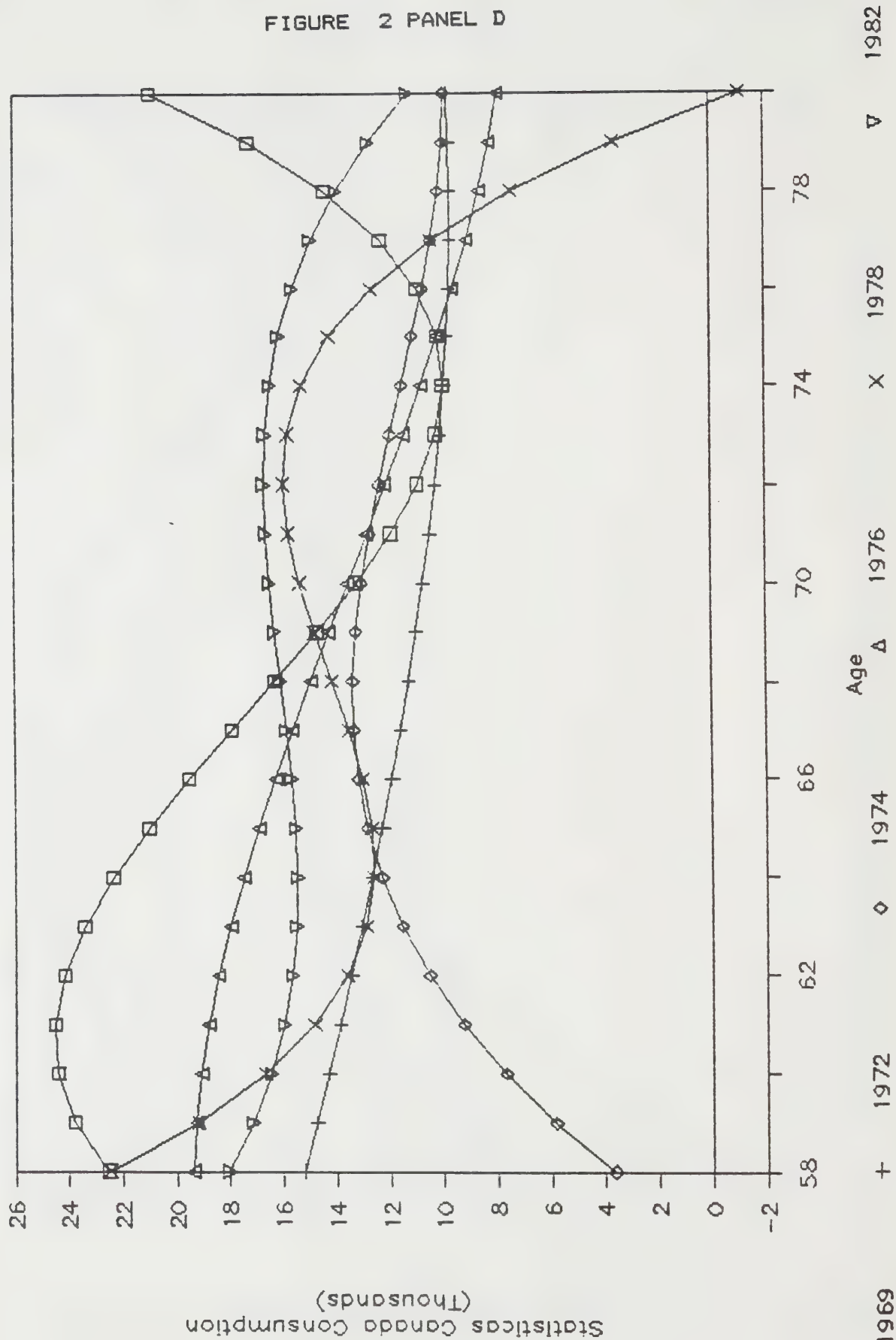
FIGURE 3 PANEL A

Wages & Salaries, Blue Collar, Working

FIGURE 3 PANEL B
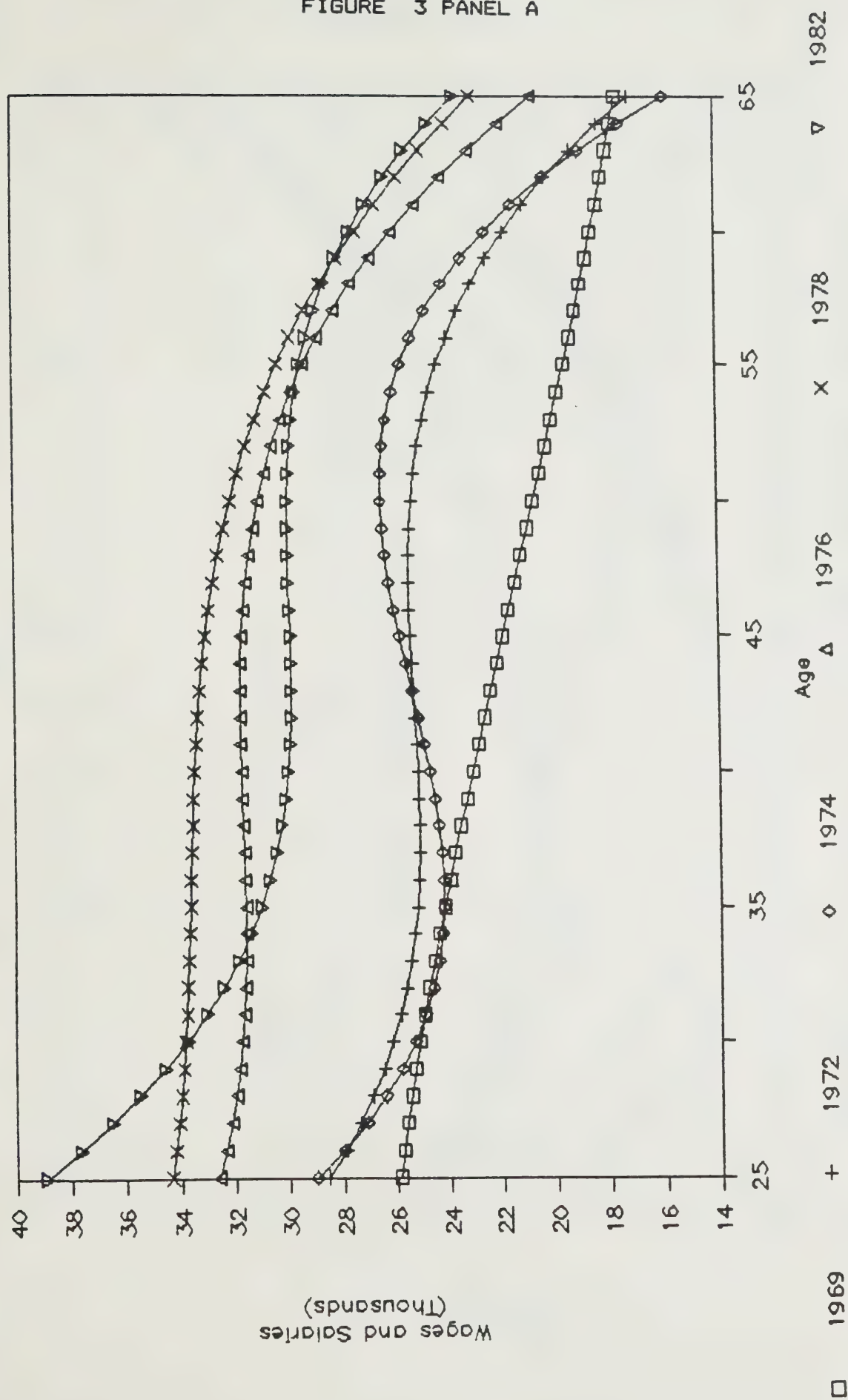
Wages & Salaries, White Collar, Working
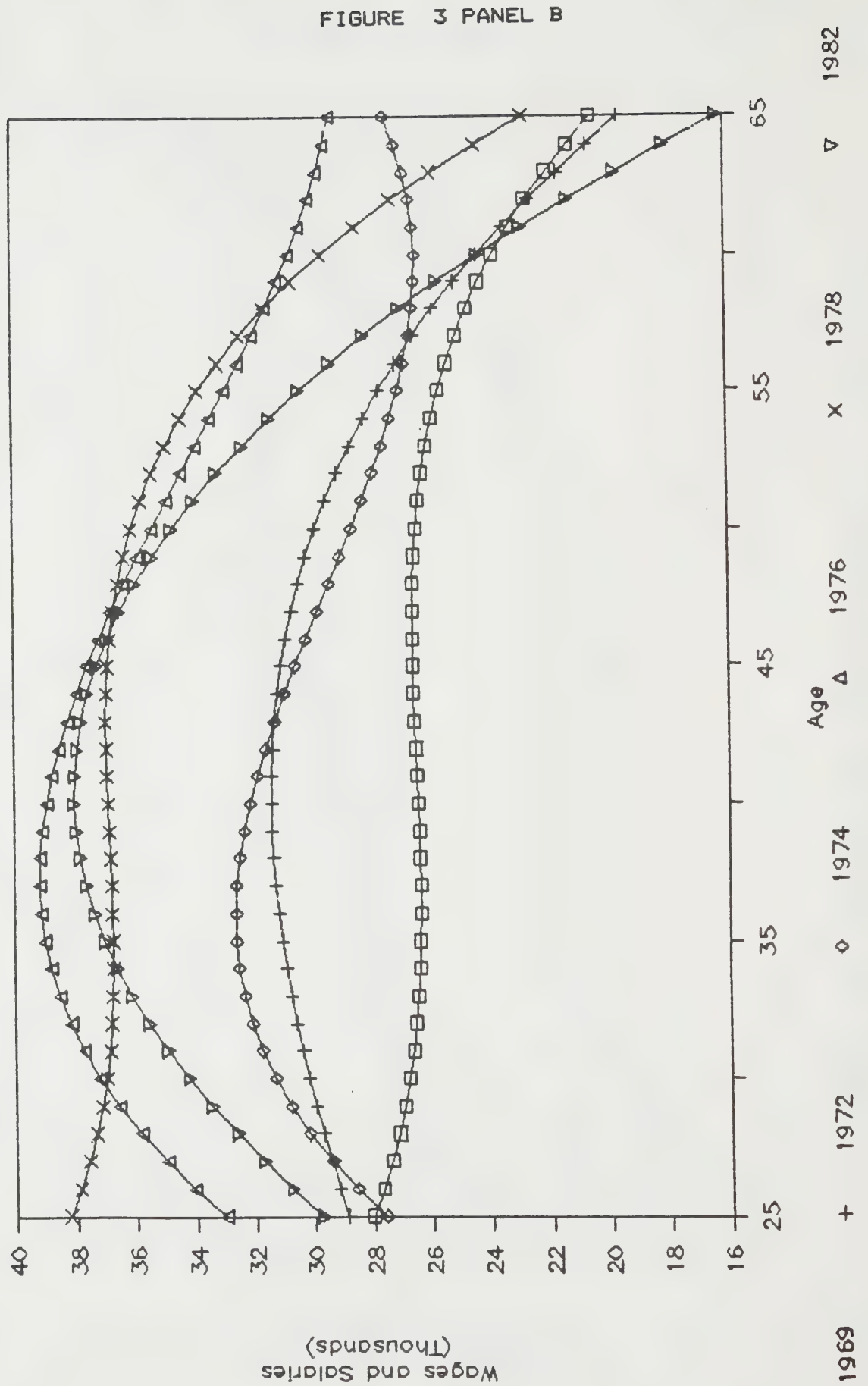
FIGURE   4 PANEL A

After Tax Income, Blue Collar, Working
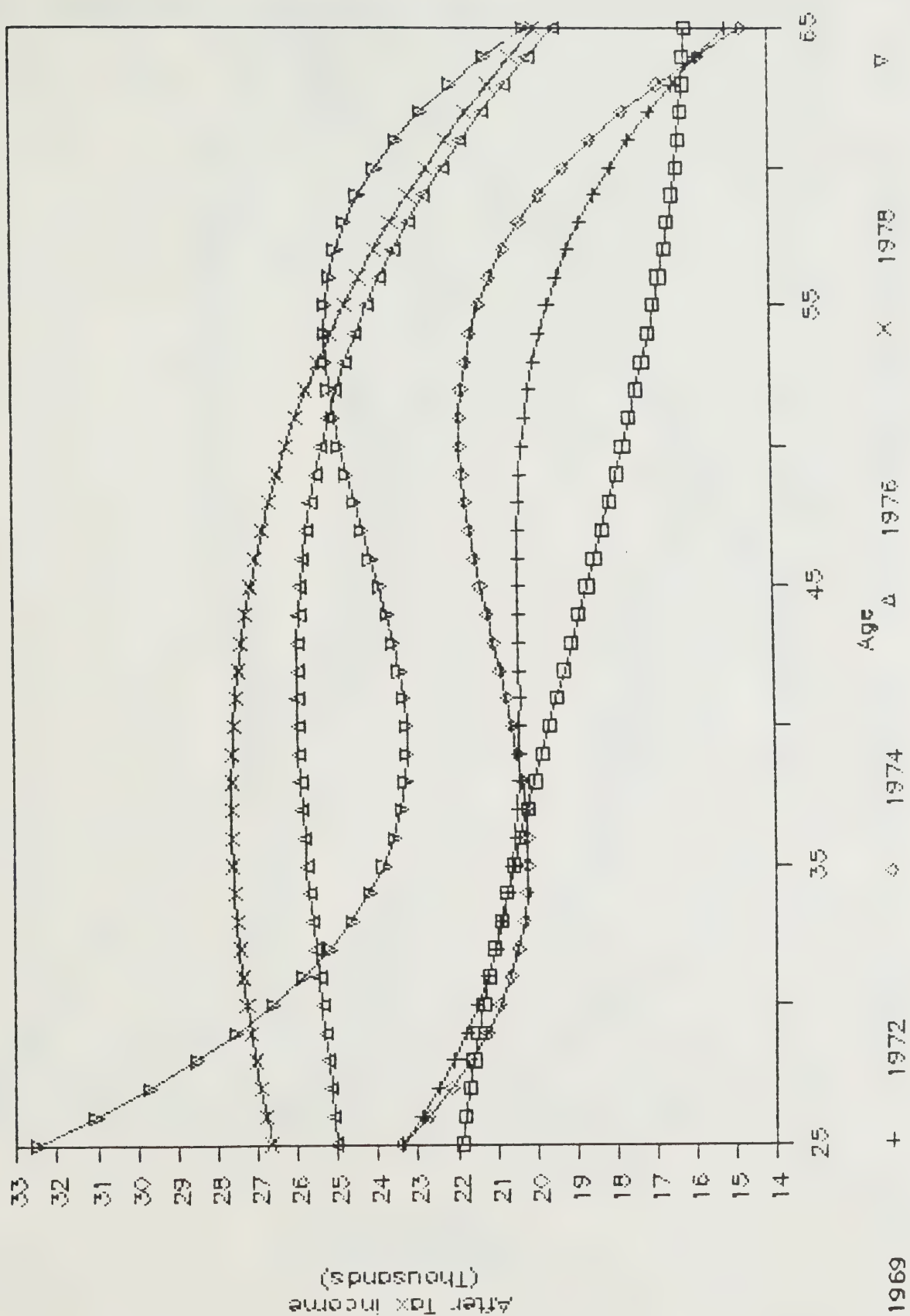
After tax income, White Collar, Working
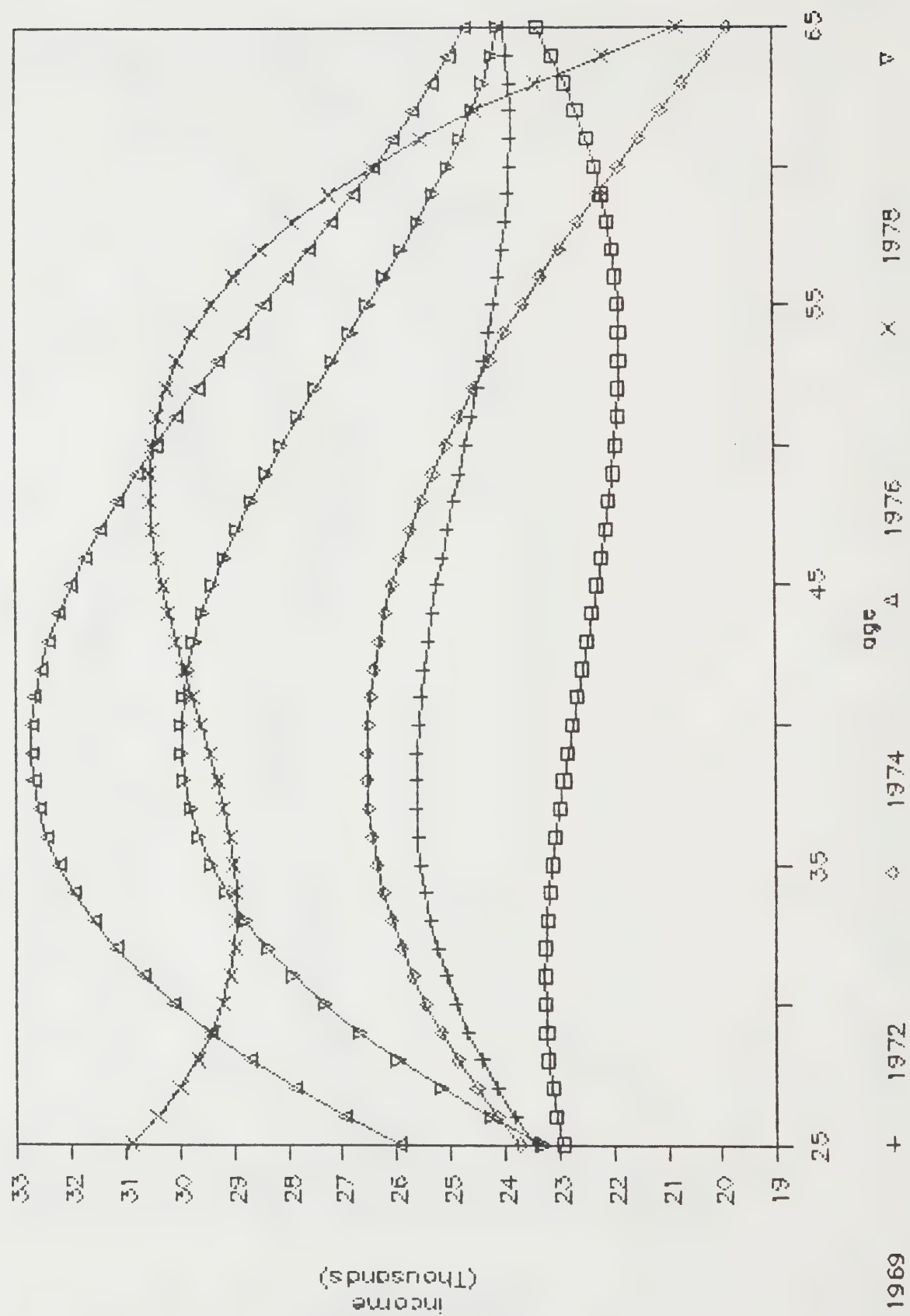
FIGURE 4 PANEL B

After Tax Income, Blue Collar, Retired

FIGURE 4 PANEL C

FIGURE 4 PANEL D

After Tax Income, White Collar, Retired
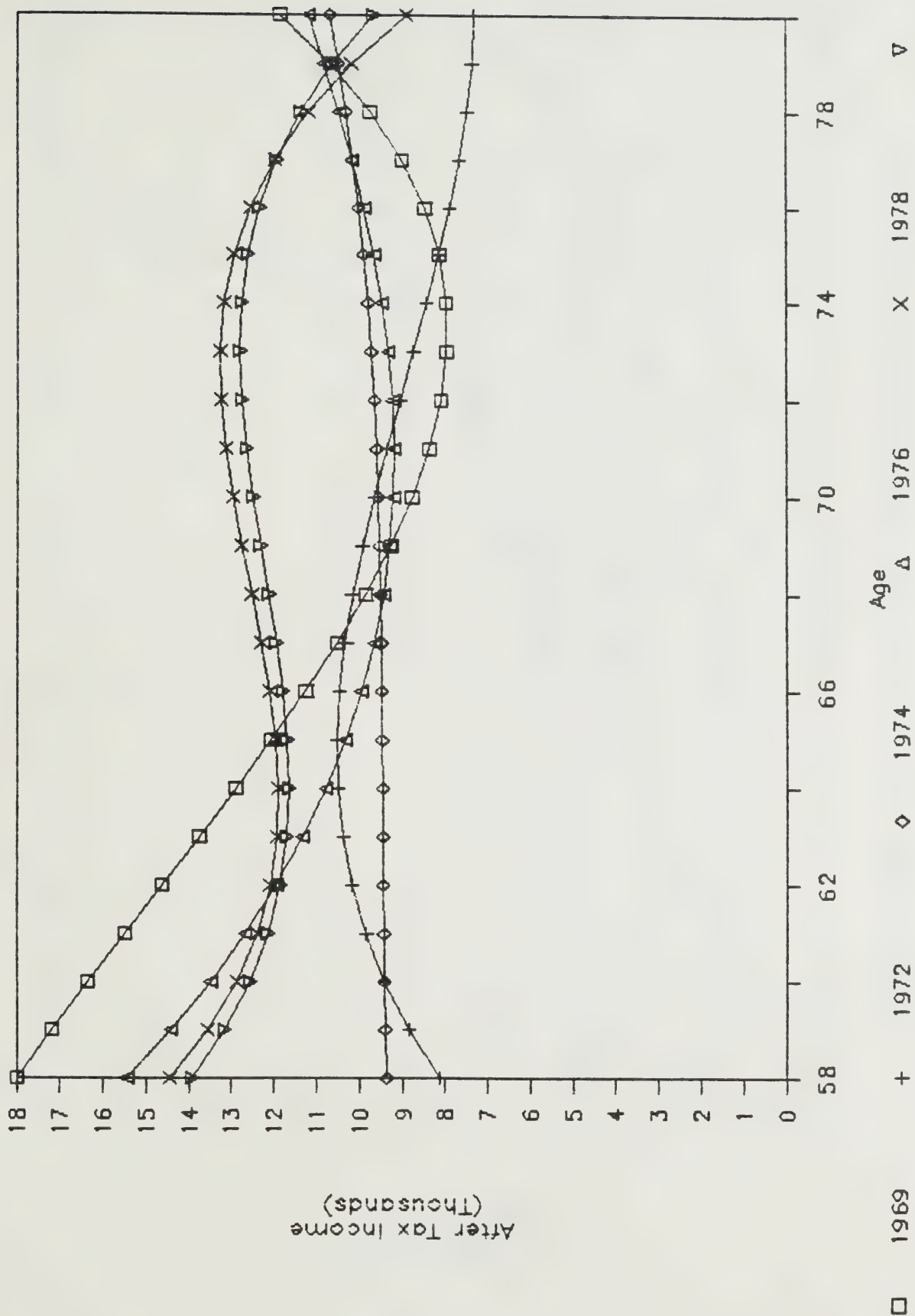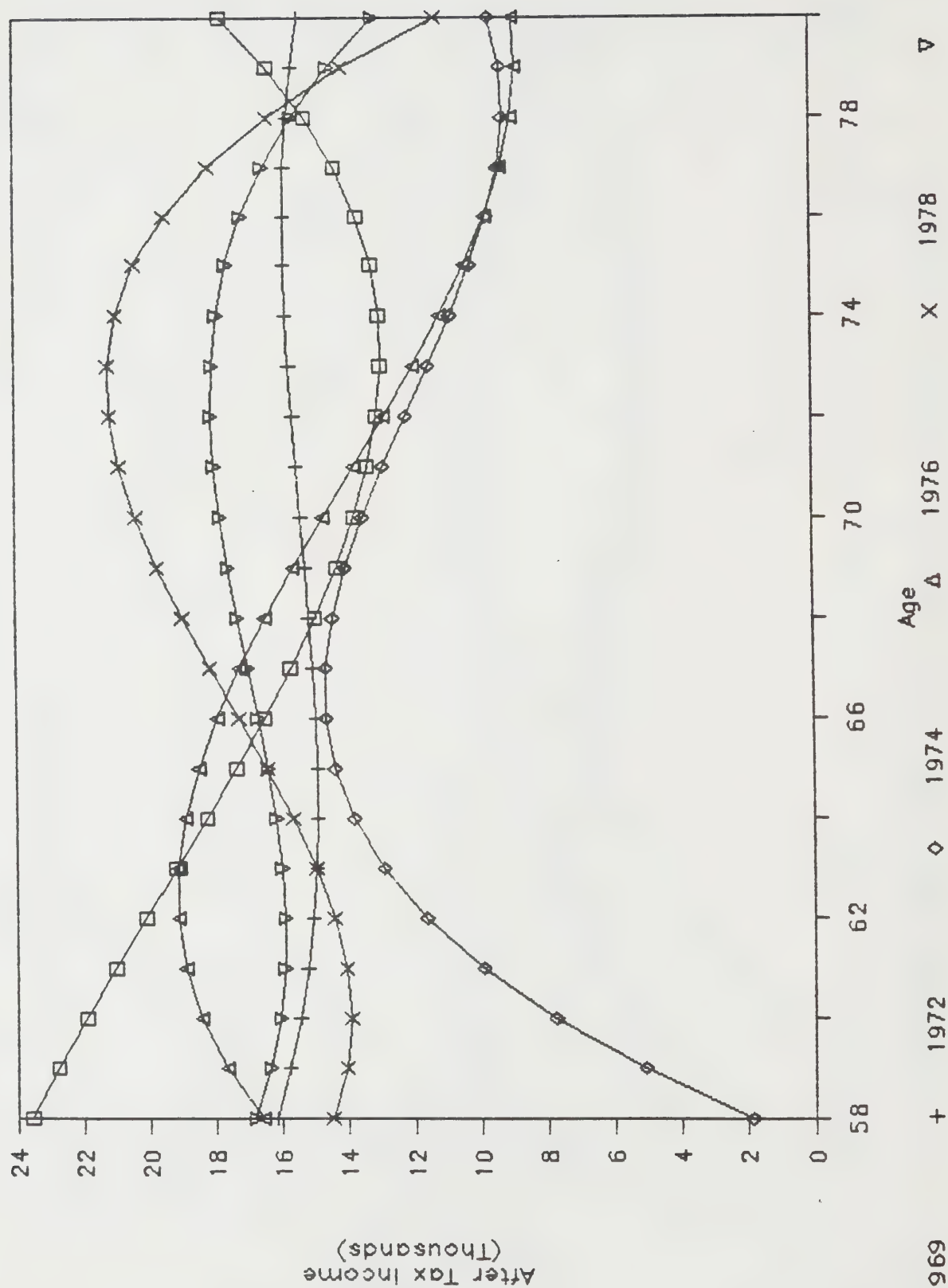
FIGURE 5

Probability of Head Not Working–retired

probability of HNWR

25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79

□ Blue Collar   + White Collar
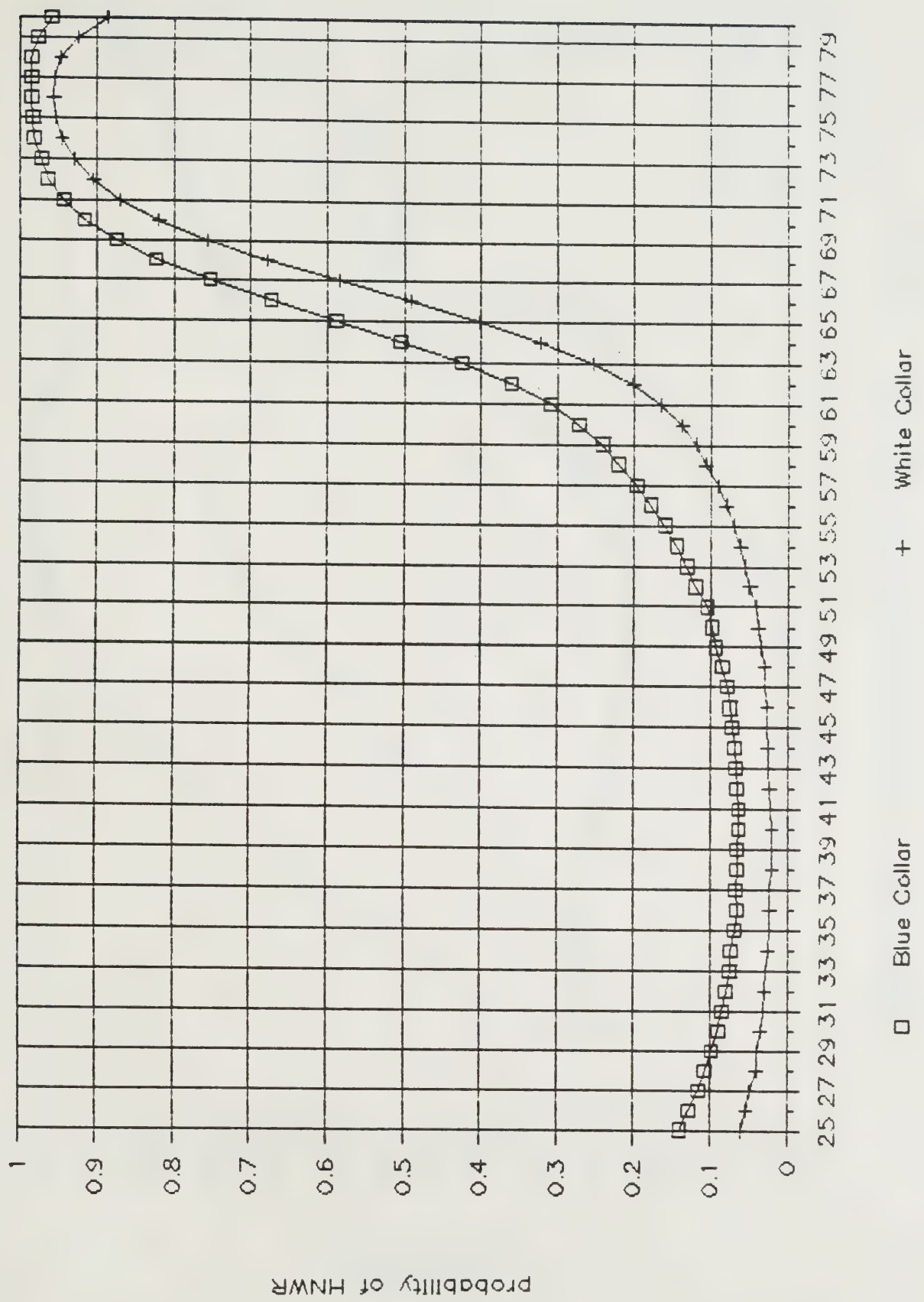
FIGURE 6

Average Consumption 1969–1982
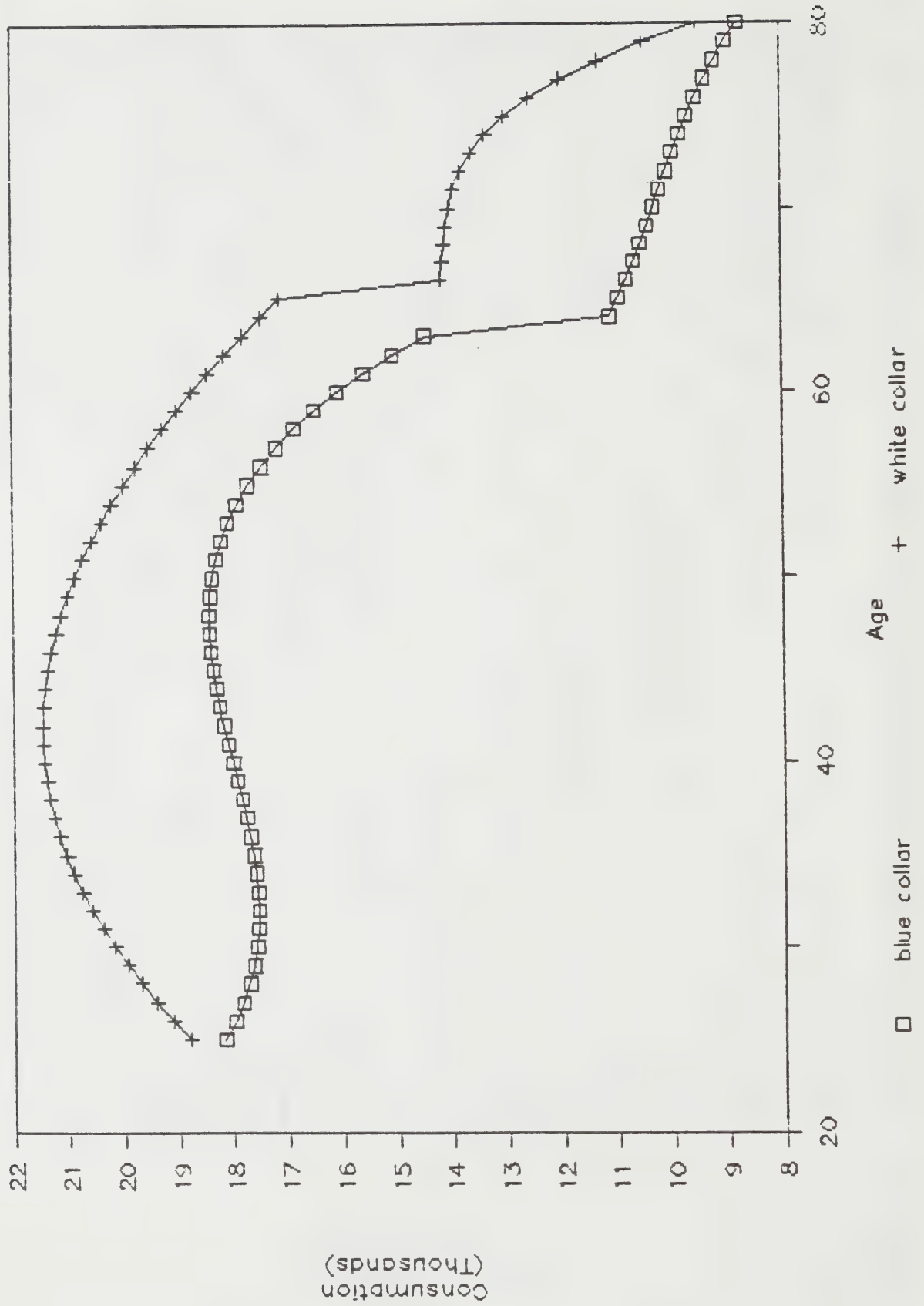
FIGURE 7

Consumption by wc and bc cohorts

Consumption (Thousands)

Age

□ wc growth at 1%   +   bc growth at 1%
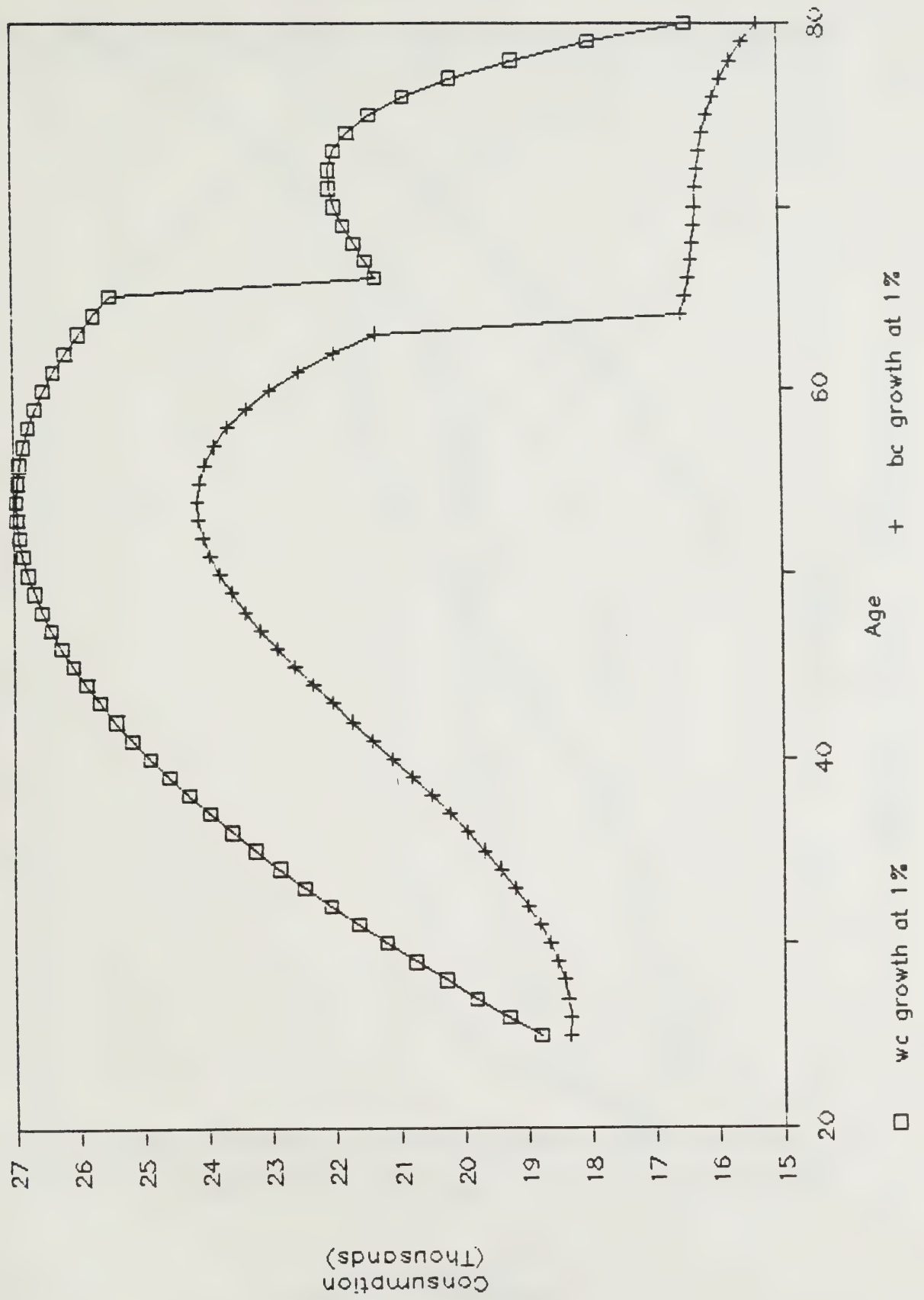
FIGURE 8

Wages and Salaries
cross-section
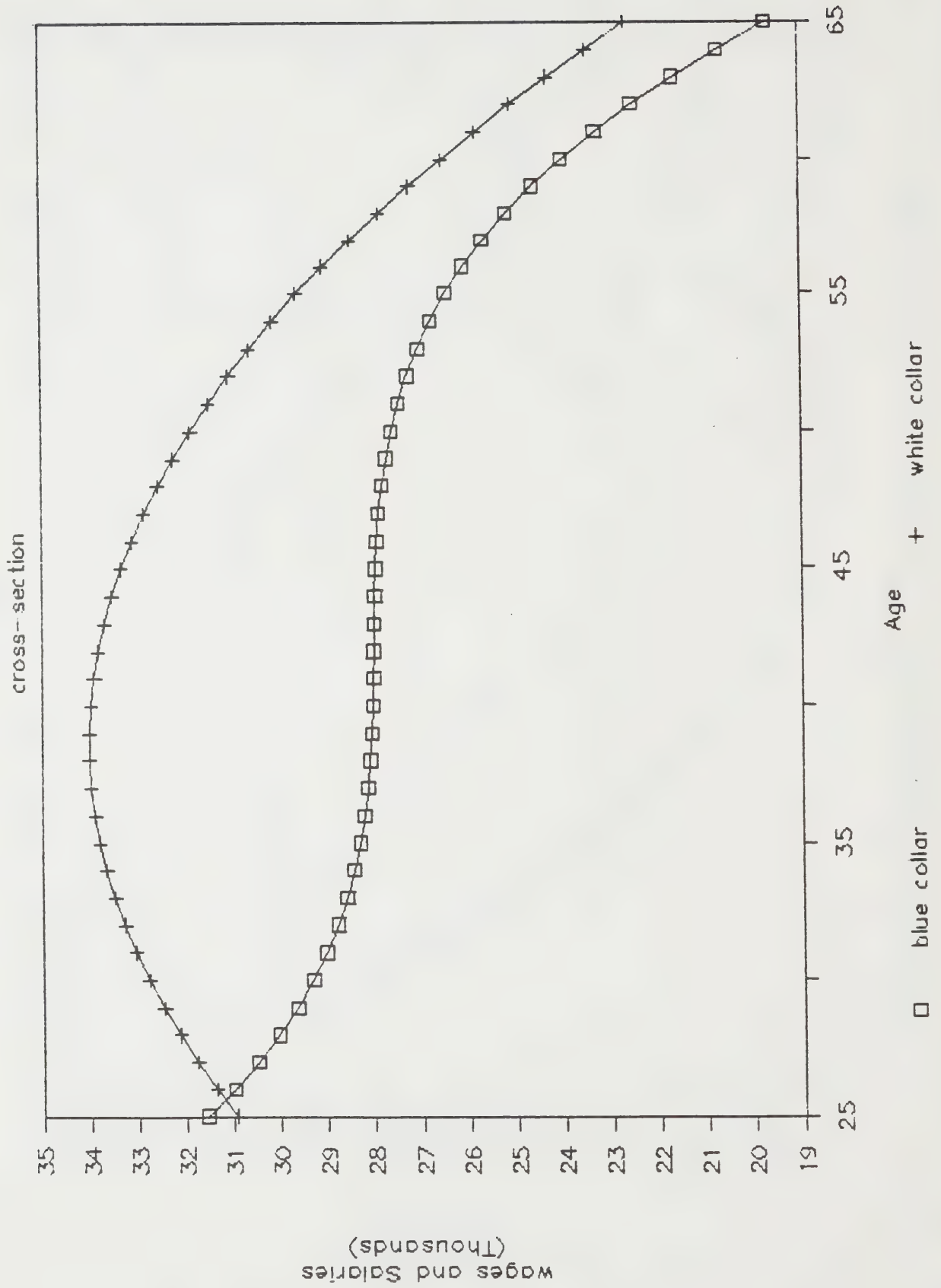
FIGURE 9

Wages and Salaries
growth at 1%
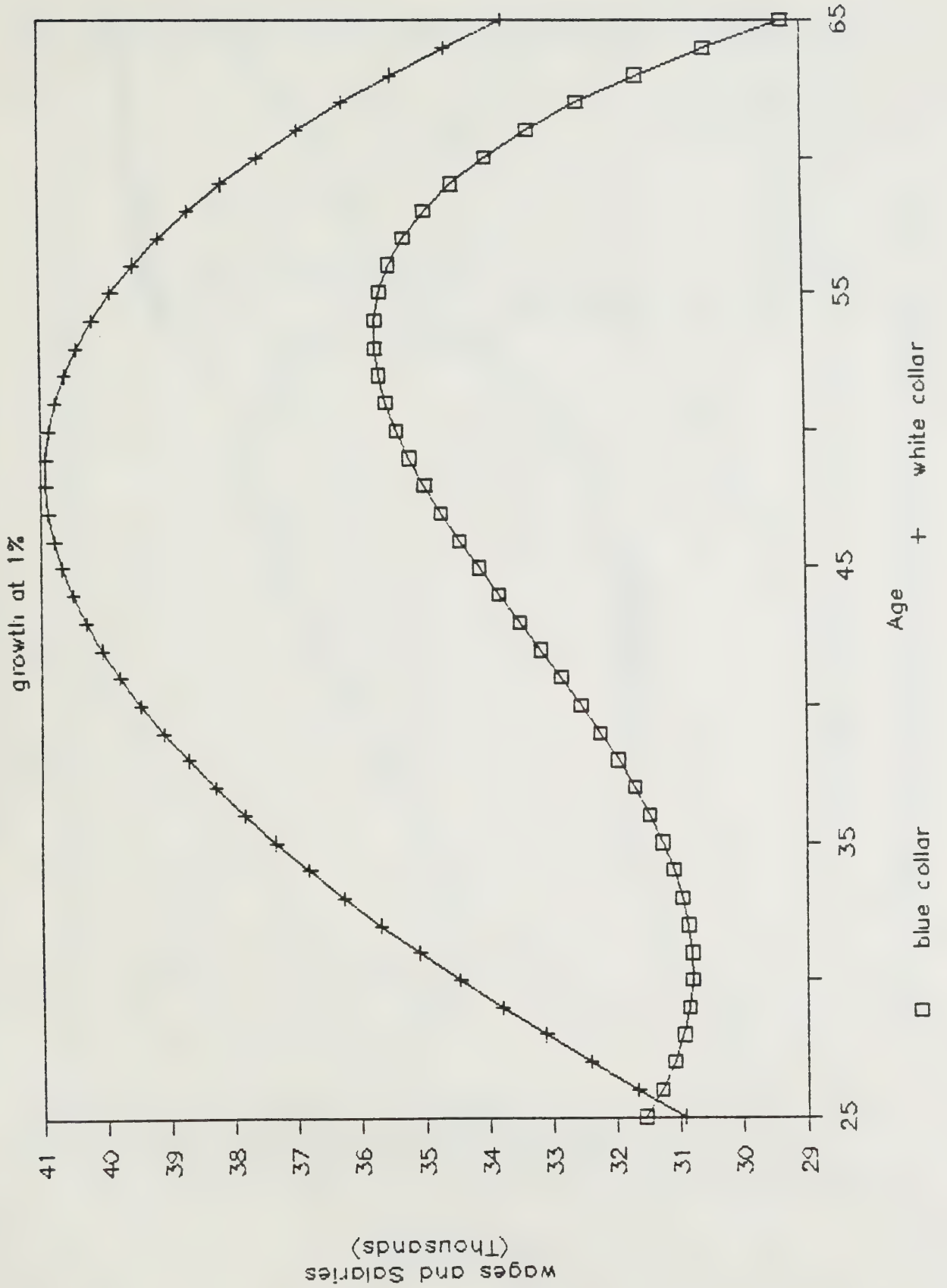
FIGURE 10

After tax Income, Average 1969-82

FIGURE 11
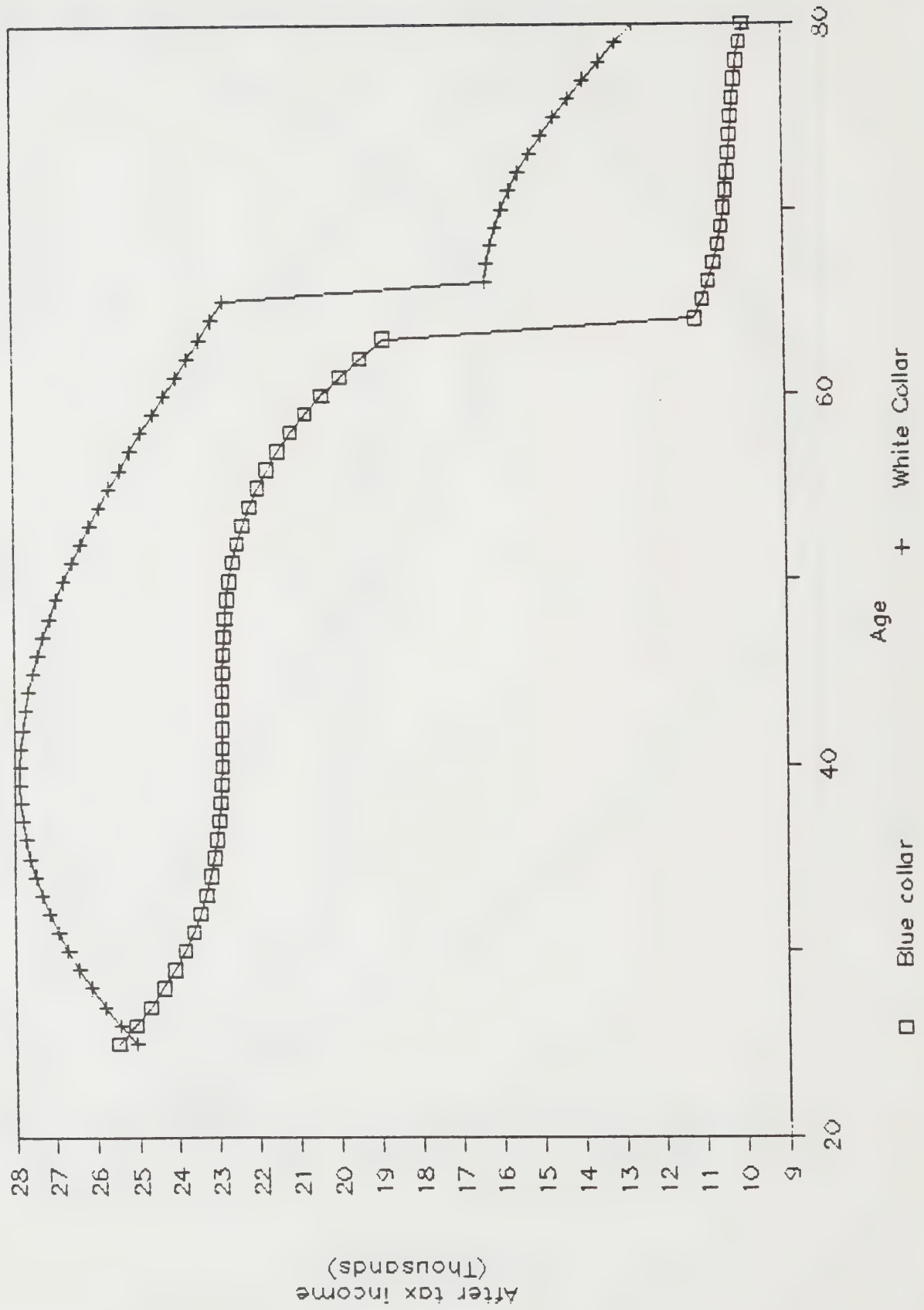
After tax income —white and blue collar

Growth at 1%

Age   □ blue collar   + white collar
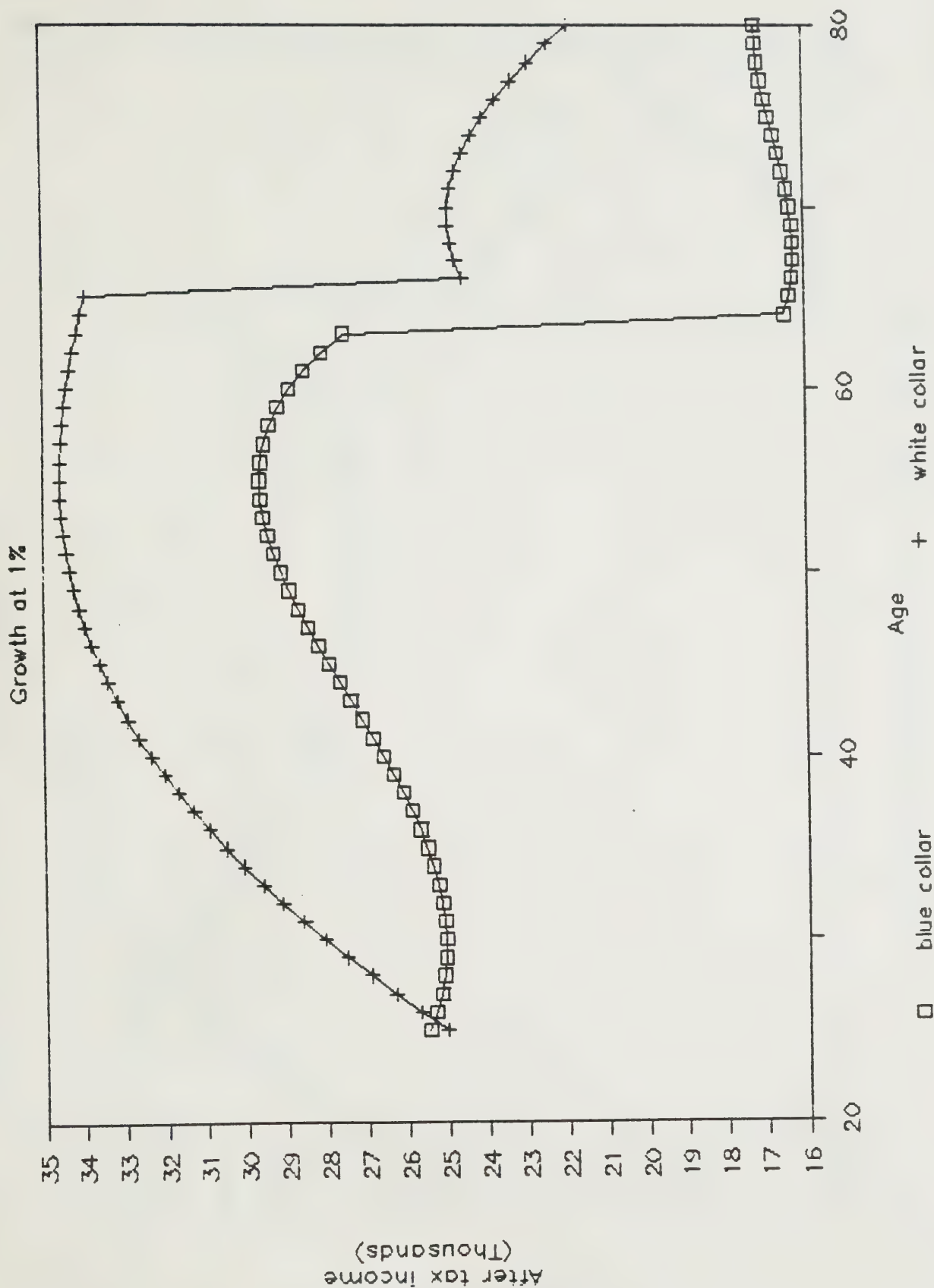
FIGURE 12

Consumption-income ratios
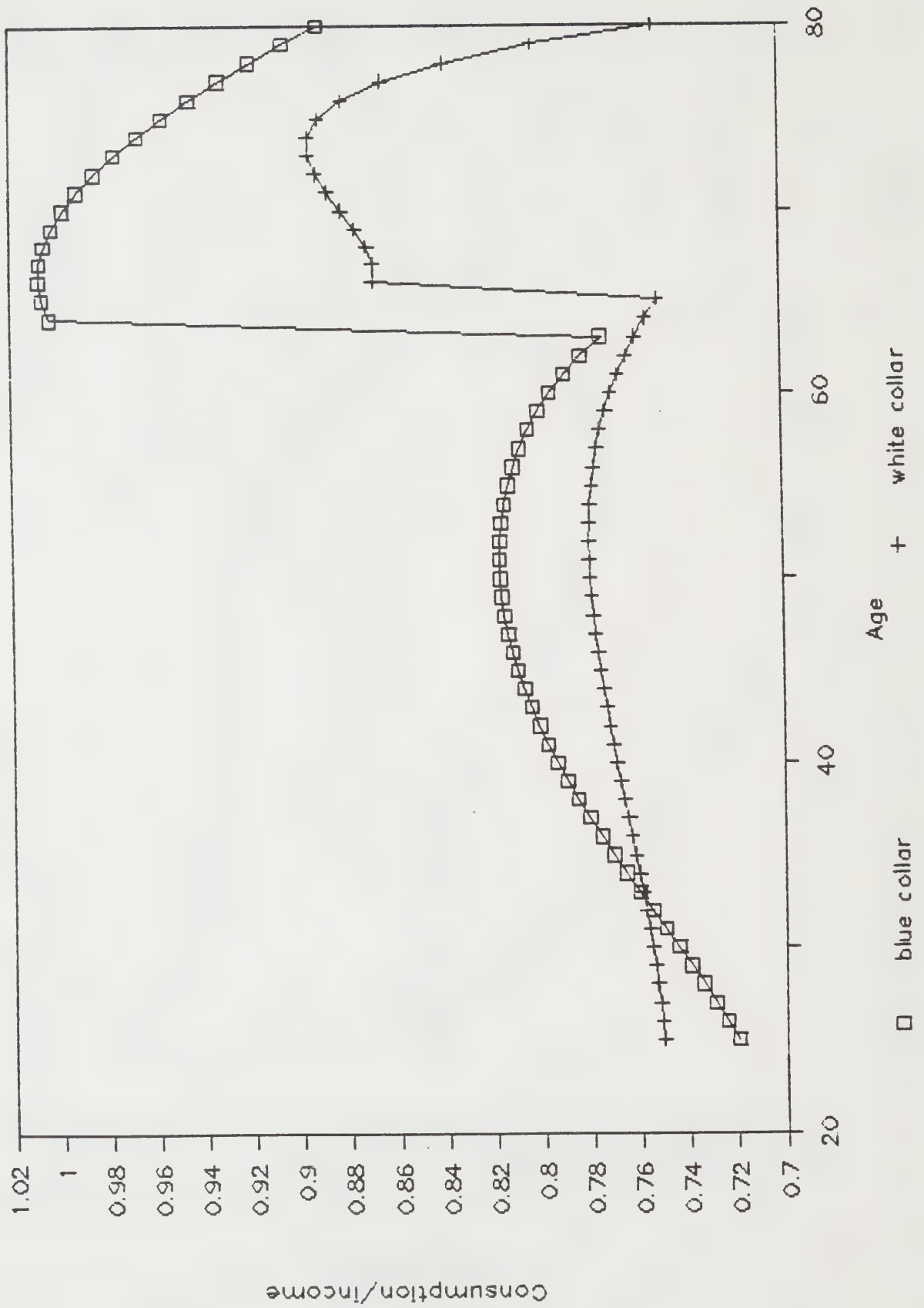
FIGURE 13

Stats Canada Consumption Income Ratio

--working file----

Consumption/Income

Age

□ Blue Collar   +   White Collar
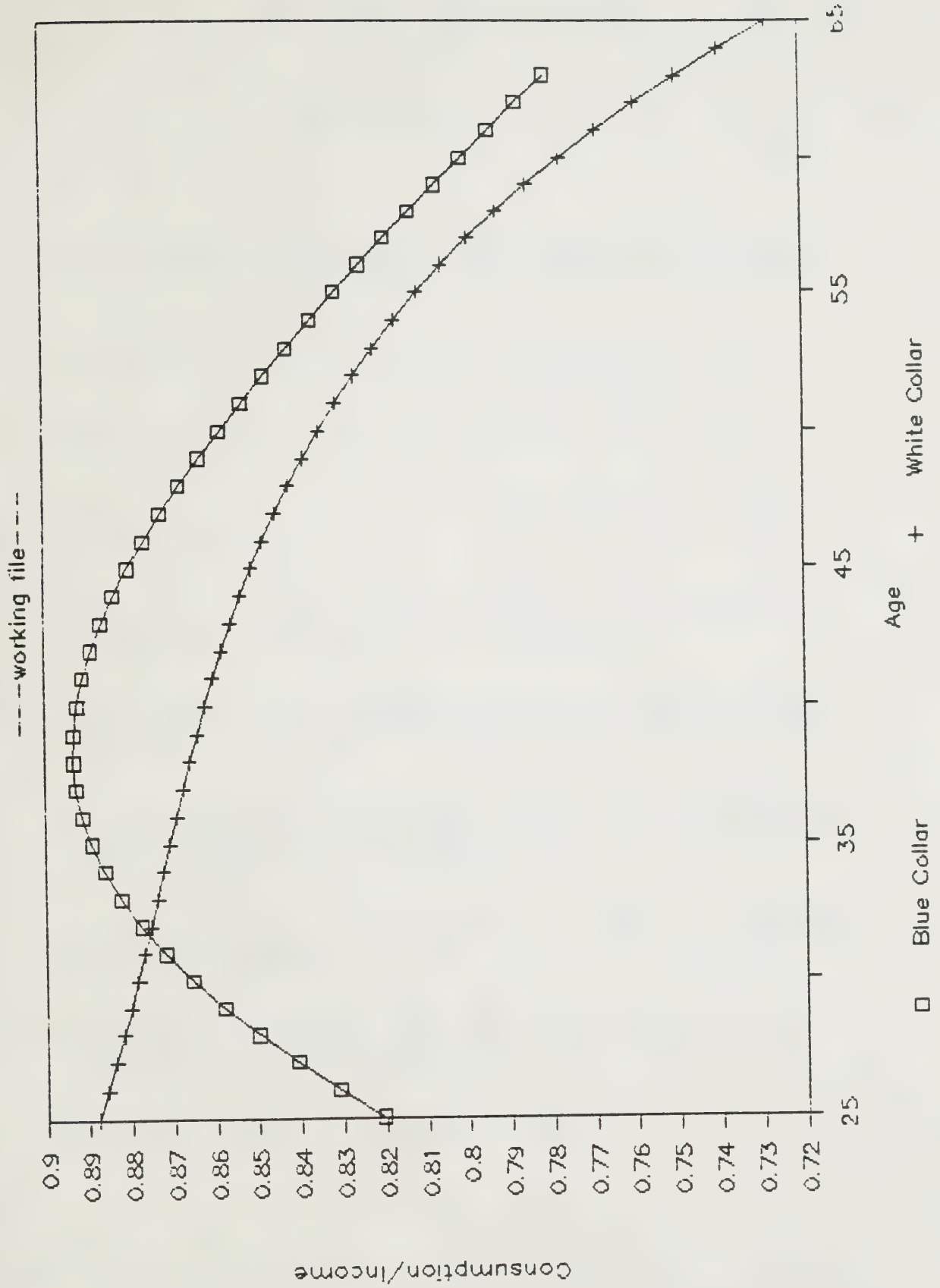
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